DEEP HOLE DRILLING

SINGLE TUBE SYSTEM - EXTERNAL THREAD

Drilling Head		Diameter Range	Hole Tolerance	Surface Finish	Fixture	Page
DSD-E0		8.00-14.79	IT9	2µm	Brazed Tips	602
DSD-E1		12.60-20.00				602
DSD-E3		12.60-65.00				603
DSD-EC		38.00-232.99		3µm	Indexable Inserts	604
DSD-EF-FT		16.00-28.00				604
DSD-EF-FB		25.00-65.00				605

Counterbore Head		Diameter Range	Hole Tolerance	Surface Finish	Fixture	Page
DSC-E1		18.91-65.00	IT7	1µm	Brazed Tips	605
DST-E1		18.91-65.00				606
DSC-EA		25.00-39.99	IT8	2µm	Indexable Inserts	606
DSC-EC		40.00-99.99				607

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SINGLE TUBE SYSTEM - INTERNAL THREAD

Drilling Head		Diameter Range	Hole Tolerance	Surface Finish	Fixture	Page
DSD-I1		14.51-65.00	IT9	3µm	Brazed Tips	607
DSD-IF-FT		16.00-28.00			Indexable Inserts	608
DSD-IF-FB		25.00-65.00				608
DSD-IC		38.00-245.99				609

Counterbore Head		Diameter Range	Hole Tolerance	Surface Finish	Fixture	Page
DSC-I1		14.51-65.00	IT7	1µm	Brazed Tips	610
DST-I1		14.51-65.00				611
DSC-IA		25.00-39.99	IT8	2µm	Indexable Inserts	611
DSC-IC		40.00-110.99				612

DOUBLE TUBE SYSTEM

Drilling Head		Diameter Range	Hole Tolerance	Surface Finish	Fixture	Page
DDD-E3		18.41-65.00	IT9	2µm	Brazed Tips	612
DDD-EF-FT		18.41-28.00		3µm	Indexable Inserts	613
DDD-EF-FB		25.00-65.00				613
DDD-EC		38.00-168.99				614

Counterbore Head		Diameter Range	Hole Tolerance	Surface Finish	Fixture	Page
DDC-E1		18.41-65.00	IT7	1µm	Brazed Tips	614
DDT-E1		18.41-65.00				615

DEEP HOLE DRILLING Index

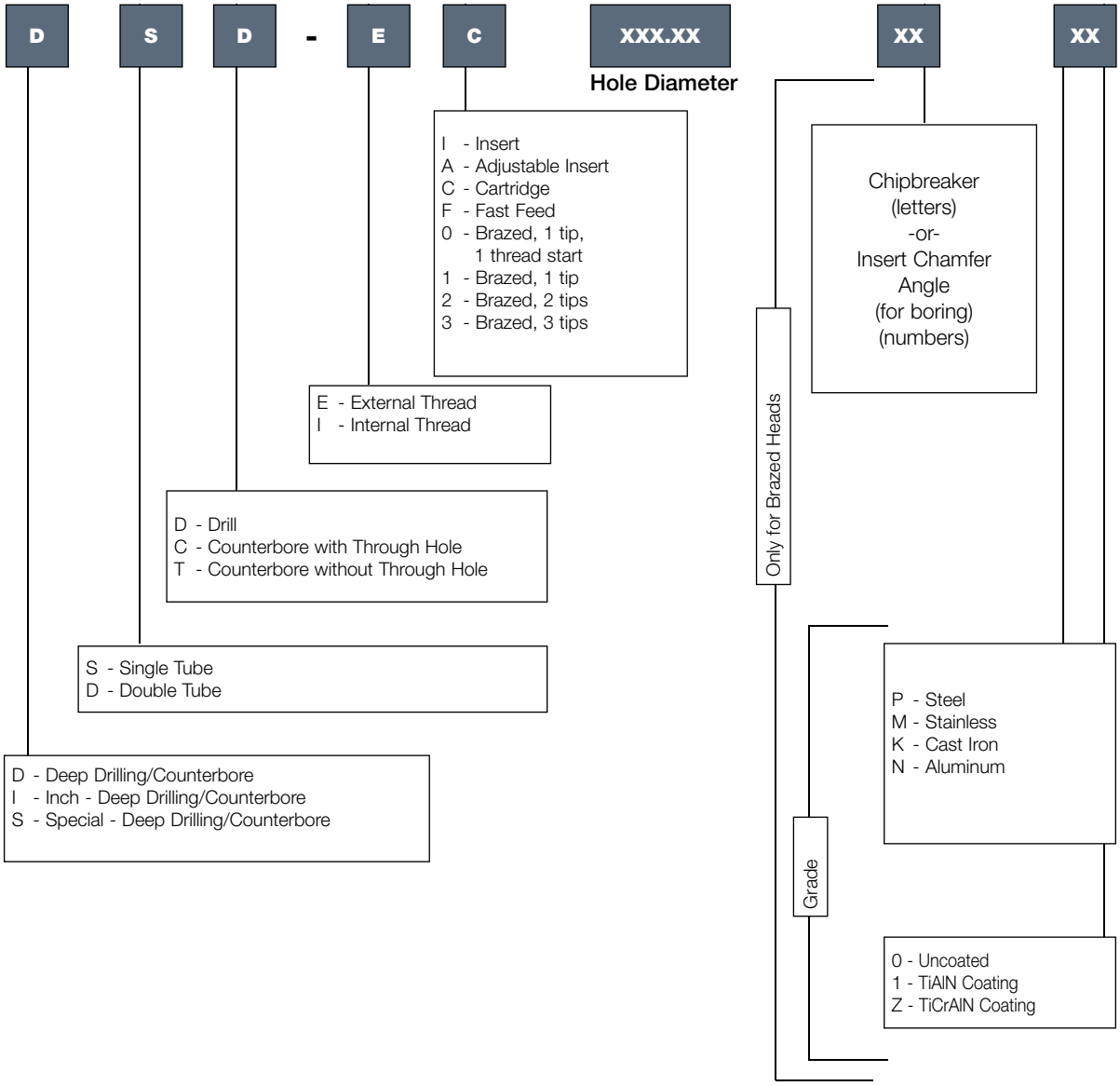
Single Tube System

Single Tube System (STS) –
Cooling fluid is induced through the gap between the drill and the hole. Conveying the chips through the tube requires the use of dedicated machines.

Double Tube System

Double Tube System (DTS) -
Cooling fluid is induced between the coaxial tubes, conveying the chips through the inner tube and can be applied on standard machines.

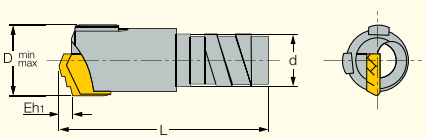
Deep Drilling Heads Identification System



ISCARDEEPDRILL

DSD-E0

Deep Single Tube Drills with External Single Thread Connection and a Brazed Single Tip



NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head

Designation	D min	D max	L	d	Eh1	Ts(1)
DSD-E0 8.00-8.99 NOM 0	8.00	8.99	35.00	6.00	2.00	TS001
DSD-E0 8.00-8.99 NOM 2	8.00	8.99	35.00	6.00	2.00	TS001
DSD-E0 9.00-9.99 NOM 0	9.00	9.99	35.00	7.20	2.00	TS002
DSD-E0 9.00-9.99 NOM 2	9.00	9.99	35.00	7.20	2.00	TS002
DSD-E0 10.00-10.99 NOM 0	10.00	10.99	35.20	7.60	2.20	TS003
DSD-E0 10.00-10.99 NOM 2	10.00	10.99	35.20	7.60	2.20	TS003
DSD-E0 11.00-11.99 NOM 0	11.00	11.99	35.20	8.60	2.20	TS004
DSD-E0 11.00-11.99 NOM 2	11.00	11.99	35.20	8.60	2.20	TS004
DSD-E0 12.00-13.49 NOM 0	12.00	13.49	35.30	9.10	2.30	TS005
DSD-E0 12.00-13.49 NOM 2	12.00	13.49	35.30	9.10	2.30	TS005
DSD-E0 13.50-14.79 NOM 0	13.50	14.79	35.40	10.80	2.40	TS006
DSD-E0 13.50-14.79 NOM 2	13.50	14.79	35.40	10.80	2.40	TS006

• The drill tip is supplied in a grade that is suitable to machine the material group indicated in the drill head designation: P-Steel, M-Stainless Steel, K-Cast Iron. • For user guide and quotation form, see pages 630-647 • Ordering example: DSD-E0 11.30 DT-PO

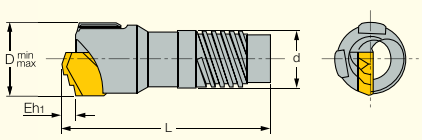
(1) Tube designation

For holders, see pages: TS*** (625)

ISCARDEEPDRILL

DSD-E1

Deep Single Tube Drills with External 2 and 4 Start Thread and a Single Brazed Tip



NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head.

Designation	D min	D max	L	d	Eh1	Threads(1)	Ts(2)
DSD-E1 12.60-13.60 NOM 0	12.60	13.60	42.50	9.60	2.30	2	TS-I01
DSD-E1 12.60-13.60 NOM 2	12.60	13.60	42.50	9.60	2.30	2	TS-I01
DSD-E1 13.61-14.60 NOM 0	13.61	14.60	42.70	10.60	2.40	2	TS-I02
DSD-E1 13.61-14.60 NOM 2	13.61	14.60	42.70	10.60	2.40	2	TS-I02
DSD-E1 14.61-15.59 NOM 0	14.61	15.59	42.70	11.60	3.00	2	TS-I03
DSD-E1 14.61-15.59 NOM 2	14.61	15.59	42.70	11.60	3.00	2	TS-I03
DSD-E1 15.60-16.70 NOM 0	15.60	16.70	42.70	11.60	2.40	4	TS-I0
DSD-E1 15.60-16.70 NOM 2	15.60	16.70	42.70	11.60	2.40	4	TS-I0
DSD-E1 16.71-17.70 NOM 0	16.71	17.70	43.20	13.60	3.00	4	TS-I1
DSD-E1 16.71-17.70 NOM 2	16.71	17.70	43.20	13.60	3.00	4	TS-I1
DSD-E1 17.71-18.90 NOM 0	17.71	18.90	43.60	14.50	3.30	4	TS-I2
DSD-E1 17.71-18.90 NOM 2	17.71	18.90	43.60	14.50	3.30	4	TS-I2
DSD-E1 18.91-20.00 NOM 0	18.91	20.00	43.60	15.50	3.30	4	TS-I3
DSD-E1 18.91-20.00 NOM 2	18.91	20.00	43.60	15.50	3.30	4	TS-I3

• The drill tip is supplied in a grade that is suitable to machine the material group indicated in the drill head designation: P-Steel, M-Stainless Steel, K-Cast Iron. • For user guide and quotation form, see pages 630-647 • Ordering example: DSD-E1 14.50 DT-PO

(1) No. of thread starts

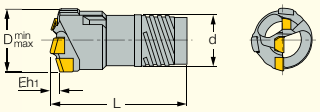
(2) Tube designation

For holders, see pages: TS-I** (626)

ISCARDEEPDRILL

DSD-E3

Deep Single Tube Drills with External 2 and 4 Start Thread and 3 Brazed Tips



NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head.

Designation	D min	D max	L	d	Eh1	Threads(1)	Ts(2)
DSD-E3 12.60-13.10 NOM 0	12.60	13.10	43.00	9.60	1.10	2	TS-I01
DSD-E3 12.60-13.10 NOM 2	12.60	13.10	43.00	9.60	1.10	2	TS-I01
DSD-E3 13.11-13.60 NOM 0	13.11	13.60	43.00	9.60	1.10	2	TS-I01
DSD-E3 13.11-13.60 NOM 2	13.11	13.60	43.00	9.60	1.10	2	TS-I01
DSD-E3 13.61-14.10 NOM 0	13.61	14.10	43.00	10.60	1.20	2	TS-I02
DSD-E3 13.61-14.10 NOM 2	13.61	14.10	43.00	10.60	1.20	2	TS-I02
DSD-E3 14.11-14.60 NOM 2	14.11	14.60	43.00	10.60	1.20	2	TS-I02
DSD-E3 14.11-14.60 NOM 0	14.11	14.60	43.00	10.60	1.20	2	TS-I02
DSD-E3 14.61-15.10 NOM 0	14.61	15.10	43.00	11.60	1.30	2	TS-I03
DSD-E3 14.61-15.10 NOM 2	14.61	15.10	43.00	11.60	1.30	2	TS-I03
DSD-E3 15.11-15.59 NOM 0	15.11	15.59	43.00	11.60	1.30	2	TS-I03
DSD-E3 15.11-15.59 NOM 2	15.11	15.59	43.00	11.60	1.30	2	TS-I03
DSD-E3 15.60-16.20 NOM 0	15.60	16.20	43.00	12.60	2.70	4	TS-I0
DSD-E3 15.60-16.20 NOM 2	15.60	16.20	43.00	12.60	2.70	4	TS-I0
DSD-E3 16.21-16.70 NOM 0	16.21	16.70	43.00	12.60	2.70	4	TS-I0
DSD-E3 16.21-16.70 NOM 2	16.21	16.70	43.00	12.60	2.70	4	TS-I0
DSD-E3 16.71-17.20 NOM 0	16.71	17.20	43.00	13.60	2.70	4	TS-I1
DSD-E3 16.71-17.20 NOM 2	16.71	17.20	43.00	13.60	2.70	4	TS-I1
DSD-E3 17.21-17.70 NOM 0	17.21	17.70	43.00	13.60	2.70	4	TS-I1
DSD-E3 17.21-17.70 NOM 2	17.21	17.70	43.00	13.60	2.70	4	TS-I1
DSD-E3 17.71-18.40 NOM 0	17.71	18.40	47.00	14.50	2.80	4	TS-I2
DSD-E3 17.71-18.40 NOM 2	17.71	18.40	47.00	14.50	2.80	4	TS-I2
DSD-E3 18.41-18.90 NOM 0	18.41	18.90	47.00	14.50	2.90	4	TS-I2
DSD-E3 18.41-18.90 NOM 2	18.41	18.90	47.00	14.50	2.90	4	TS-I2
DSD-E3 18.91-20.00 NOM 0	18.91	20.00	47.00	15.50	2.90	4	TS-I3
DSD-E3 18.91-20.00 NOM 2	18.91	20.00	47.00	15.50	2.90	4	TS-I3
DSD-E3 20.01-21.80 NOM 0	20.01	21.80	52.50	16.00	3.20	4	TS-I4
DSD-E3 20.01-21.80 NOM 2	20.01	21.80	52.60	16.00	3.20	4	TS-I4
DSD-E3 21.81-24.10 NOM 0	21.81	24.10	56.00	18.00	3.20	4	TS-I5
DSD-E3 21.81-24.10 NOM 2	21.81	24.10	56.00	18.00	3.20	4	TS-I5
DSD-E3 24.11-26.40 NOM 0	24.11	26.40	57.50	19.50	3.50	4	TS-I6
DSD-E3 24.11-26.40 NOM 2	24.11	26.40	57.50	19.50	3.50	4	TS-I6
DSD-E3 26.41-28.70 NOM 0	26.41	28.70	57.50	21.00	3.70	4	TS-I7
DSD-E3 26.41-28.70 NOM 2	26.41	28.70	57.50	21.00	3.70	4	TS-I7
DSD-E3 28.71-31.00 NOM 0	28.71	31.00	63.50	23.50	4.00	4	TS-I8
DSD-E3 28.71-31.00 NOM 2	28.71	31.00	63.50	23.50	4.00	4	TS-I8
DSD-E3 31.01-33.30 NOM 0	31.01	33.30	63.50	25.50	4.30	4	TS-I9
DSD-E3 31.01-33.30 NOM 2	31.01	33.30	63.50	25.50	4.30	4	TS-I9
DSD-E3 33.31-36.20 NOM 0	33.31	36.20	63.50	28.00	4.50	4	TS-I10
DSD-E3 33.31-36.20 NOM 2	33.31	36.20	63.50	28.00	4.50	4	TS-I10
DSD-E3 36.21-39.60 NOM 0	36.21	39.60	73.50	30.00	4.80	4	TS-I11
DSD-E3 36.21-39.60 NOM 2	36.21	39.60	73.50	30.00	4.80	4	TS-I11
DSD-E3 39.61-43.00 NOM 0	39.61	43.00	73.50	33.00	5.60	4	TS-I12
DSD-E3 39.61-43.00 NOM 2	39.61	43.00	73.50	33.00	5.60	4	TS-I12
DSD-E3 43.01-47.00 NOM 0	43.01	47.00	75.00	36.00	5.40	4	TS-I13
DSD-E3 43.01-47.00 NOM 2	43.01	47.00	75.00	36.00	5.40	4	TS-I13
DSD-E3 47.01-51.70 NOM 0	47.01	51.70	75.00	39.00	6.10	4	TS-I14
DSD-E3 47.01-51.70 NOM 2	47.01	51.70	75.00	39.00	6.10	4	TS-I14
DSD-E3 51.71-56.20 NOM 0	51.71	56.20	82.00	43.00	6.50	4	TS-I15
DSD-E3 51.71-56.20 NOM 2	51.71	56.20	82.00	43.00	6.50	4	TS-I15
DSD-E3 56.21-60.60 NOM 0	56.21	60.60	84.00	47.00	6.60	4	TS-I16
DSD-E3 56.21-60.60 NOM 2	56.21	60.60	84.00	47.00	6.60	4	TS-I16
DSD-E3 60.61-65.00 NOM 0	60.61	65.00	84.00	47.00	7.00	4	TS-I17
DSD-E3 60.61-65.00 NOM 2	60.61	65.00	84.00	47.00	7.00	4	TS-I17

• The drill tip is supplied in a grade that is suitable to machine the material group indicated in the drill head designation: ISO P, K, M, N materials • For user guide and quotation form, see pages 630-647 • Ordering example: DSD-E343.30 DT-PO

(1) Number of thread starts

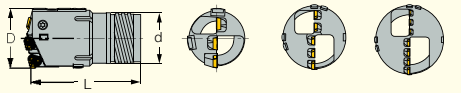
(2) Tube designation

For holders, see pages: TS-I** (626)

ISCARDEEPDRILL

DSD-EC

Deep Single Tube Drills with External 4 Start Threads and Cartridges



Designation	D min	D max	L	d	Ts(1)
DSD-EC 38.00-39.60	38.00	36.90	85.00	30.00	TS-I11
DSD-EC 39.61-43.00	39.61	43.00	85.00	33.00	TS-I12
DSD-EC 43.01-47.00	43.01	47.00	95.00	36.00	TS-I13
DSD-EC 47.01-51.70	47.01	51.70	95.00	39.00	TS-I14
DSD-EC 51.71-56.20	51.71	56.20	100.00	43.00	TS-I15
DSD-EC 56.21-60.60	56.21	60.60	110.00	47.00	TS-I16
DSD-EC 60.61-64.99	60.61	64.99	110.00	51.00	TS-I17
DSD-EC 65.00-66.99	65.00	66.99	150.00	52.00	TS-I18
DSD-EC 67.00-72.99	67.00	72.99	150.00	58.00	TS-I19
DSD-EC 73.00-79.99	73.00	79.99	150.00	63.00	TS-I20
DSD-EC 80.00-86.99	80.00	86.99	180.00	70.00	TS-I21
DSD-EC 87.00-99.99	87.00	99.99	180.00	77.00	TS-I22
DSD-EC 100.00-106.99	100.00	106.99	180.00	89.00	TS-I23
DSD-EC 107.00-111.99	107.00	111.99	180.00	89.00	TS-I23
DSD-EC 112.00-123.99	112.00	123.99	205.00	101.00	TS-I24
DSD-EC 124.00-135.99	124.00	135.99	205.00	113.00	TS-I25
DSD-EC 136.00-147.99	136.00	147.99	205.00	125.00	TS-I26
DSD-EC 148.00-159.99	148.00	159.99	225.00	137.00	TS-I27
DSD-EC 160.00-168.99	160.00	168.99	225.00	149.00	TS-I28
DSD-EC 169.00-171.99	169.00	171.99	230.00	149.00	TS-I28
DSD-EC 172.00-183.99	172.00	183.99	230.00	161.00	TS-I29
DSD-EC 184.00-195.99	184.00	195.99	250.00	173.00	TS-I30
DSD-EC 196.00-207.99	196.00	207.99	250.00	185.00	TS-I31
DSD-EC 208.00-219.99	208.00	219.99	250.00	197.00	TS-I32
DSD-EC 220.00-231.99	220.00	231.99	270.00	208.00	TS-I33
DSD-EC 232.00-232.99	232.00	232.99	270.00	220.00	TS-I34

• Important: The specified drilling range using the original outer cartridge and pad may be enlarged by using optional outer cartridges and pads as specified on page • For quotation form and user guide, see pages 630-647 • For spare parts, see page 618 • Ordering example: DSD-EC 067.30

(1) Tube designation

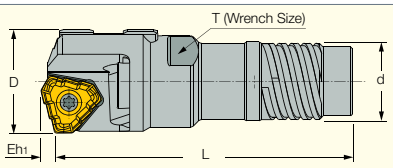
For inserts, see pages: NPMX 0802 RG (619) • NPMX 0803 RB/RG (621) • TPMX (619)

For holders, see pages: TS-I** (626)

TRIDEEP

DSD-EF-FT

Deep Single Tube Drills with External 4 Start Thread Connection Carrying Triangular Inserts



Designation	D min	D max	L	Eh1	d	Ts(1)
DSD-EF 16.00-16.70-FT	16.00	16.70	55.00	2.20	12.60	TS-I0
DSD-EF 16.71-17.70-FT	16.71	17.70	55.00	2.20	13.60	TS-I1
DSD-EF 17.71-18.90-FT	17.71	18.90	56.00	3.00	14.50	TS-I2
DSD-EF 18.91-20.00-FT	18.91	20.00	56.00	3.00	15.50	TS-I3
DSD-EF 20.01-21.80-FT	20.01	21.80	60.00	3.20	16.00	TS-I4
DSD-EF 21.81-21.99-FT	21.81	21.99	63.50	3.20	18.00	TS-I5
DSD-EF 22.00-24.10-FT	22.00	24.10	65.50	3.40	18.00	TS-I5
DSD-EF 24.11-25.00-FT	24.11	25.00	65.50	3.40	19.50	TS-I6
DSD-EF 25.01-26.40-FT	25.01	26.40	67.50	3.60	19.50	TS-I6
DSD-EF 26.41-28.00-FT	26.41	28.00	67.50	3.60	21.00	TS-I7

• Note: Each item in the attached catalog page represents a diameter range • For spare parts, insert information and user guide, see pages 616, 630-647
• Inserts and guide pads should be ordered separately • Ordering example: DSD-EF 016.50-FT

(1) Tube designation

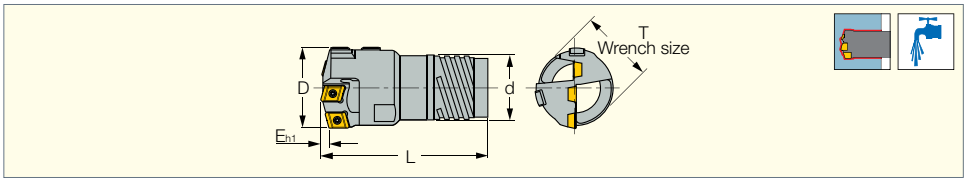
For inserts, see pages: TOGT (650)

For holders, see pages: TS-I** (626)

FINEBEAM

DSD-EF-FB

Deep Single Tube Drills with External 4 Start Thread for High Feed



Designation	D min	D max	L	Eh1	d	T	Ts(1)
DSD-EF 25.00-26.40-FB	25.00	26.40	70.00	3.00	19.50	19.0	TS-I6
DSD-EF 26.41-28.70-FB	26.41	28.70	70.00	3.00	21.00	21.0	TS-I7
DSD-EF 28.71-31.00-FB	28.71	31.00	75.00	3.00	23.50	24.0	TS-I8
DSD-EF 31.01-33.30-FB	31.01	33.30	78.00	3.00	25.50	26.0	TS-I9
DSD-EF 33.31-36.20-FB	33.31	36.20	80.00	3.00	28.00	28.0	TS-I10
DSD-EF 36.21-39.60-FB	36.21	39.60	90.00	3.00	30.00	30.0	TS-I11
DSD-EF 39.61-43.00-FB	39.61	43.00	95.00	4.00	33.00	32.0	TS-I12
DSD-EF 43.01-47.00-FB	43.01	47.00	100.00	4.00	36.00	36.0	TS-I13
DSD-EF 47.01-51.70-FB	47.01	51.70	100.00	4.00	39.00	38.0	TS-I14
DSD-EF 51.71-56.20-FB	51.71	56.20	110.00	4.00	43.00	46.0	TS-I15
DSD-EF 56.21-60.60-FB	56.21	60.60	115.00	5.00	47.00	50.0	TS-I16
DSD-EF 60.61-65.00-FB	60.61	65.00	115.00	5.00	51.00	54.0	TS-I17

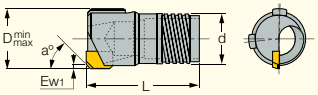
• For spare parts and insert information, see page 616 • For user guide and quotation form, see pages 630-647
• Inserts and guide pads should be ordered separately • Ordering example: DSD-EF 043.10-FB
(1) Tube designation

For inserts, see pages: NPHT-RG (622) • NPMT-L2/R2 (621)
For holders, see pages: TS-I** (626)

ISCARDEEPDRILL

DSC-E1

Deep Single Tube Counterborer with Through Hole, External 4 Start Thread and a Brazed Tip



NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head.

Designation	D min	D max	a°	Ew1	L	d	Ts(1)
DSC-E1 18.91-20.00 NOM 0	18.91	20.00	20/45	1.0	57.00	15.50	TS-I3
DSC-E1 18.91-20.00 NOM 2	18.91	20.00	20/45	1.0	57.00	15.50	TS-I3
DSC-E1 20.01-21.80 NOM 0	20.01	21.80	20/45	2.0	65.00	16.00	TS-I4
DSC-E1 20.01-21.80 NOM 2	20.01	21.80	20/45	2.0	65.00	16.00	TS-I4
DSC-E1 21.81-24.10 NOM 0	21.81	24.10	20/45	2.0	65.00	18.00	TS-I5
DSC-E1 21.81-24.10 NOM 2	21.81	24.10	20/45	2.0	65.00	18.00	TS-I5
DSC-E1 24.11-26.40 NOM 0	24.11	26.40	20/45	2.0	65.00	19.50	TS-I6
DSC-E1 24.11-26.40 NOM 2	24.11	26.40	20/45	2.0	65.00	19.50	TS-I6
DSC-E1 26.41-28.70 NOM 0	26.41	28.70	20/45	2.0	65.00	21.00	TS-I7
DSC-E1 26.41-28.70 NOM 2	26.41	28.70	20/45	2.0	65.00	21.00	TS-I7
DSC-E1 28.71-31.00 NOM 0	28.71	31.00	20/45	2.0	70.00	23.50	TS-I8
DSC-E1 28.71-31.00 NOM 2	28.71	31.00	20/45	2.0	70.00	23.50	TS-I8
DSC-E1 31.01-33.30 NOM 0	31.01	33.30	20/45	3.0	70.00	25.50	TS-I9
DSC-E1 31.01-33.30 NOM 2	31.01	33.30	20/45	3.0	70.00	25.50	TS-I9
DSC-E1 33.31-36.20 NOM 0	33.31	36.20	20/45	3.0	70.00	28.00	TS-I10
DSC-E1 33.31-36.20 NOM 2	33.31	36.20	20/45	3.0	70.00	28.00	TS-I10
DSC-E1 36.21-39.60 NOM 0	36.21	39.60	20/45	3.0	82.00	30.00	TS-I11
DSC-E1 36.21-39.60 NOM 2	36.21	39.60	20/45	3.0	82.00	30.00	TS-I11
DSC-E1 39.61-43.00 NOM 0	39.61	43.00	20/45	3.0	82.00	33.00	TS-I12
DSC-E1 39.61-43.00 NOM 2	39.61	43.00	20/45	3.0	82.00	33.00	TS-I12
DSC-E1 43.01-47.00 NOM 0	43.01	47.00	20/45	3.0	82.00	36.00	TS-I13
DSC-E1 43.01-47.00 NOM 2	43.01	47.00	20/45	3.0	82.00	36.00	TS-I13
DSC-E1 47.01-51.70 NOM 0	47.01	51.70	20/45	3.0	82.00	39.00	TS-I14
DSC-E1 47.01-51.70 NOM 2	47.01	51.70	20/45	3.0	82.00	39.00	TS-I14
DSC-E1 51.71-56.20 NOM 0	51.71	56.20	20/45	3.0	93.00	43.00	TS-I15
DSC-E1 51.71-56.20 NOM 2	51.71	56.20	20/45	3.0	93.00	43.00	TS-I15
DSC-E1 56.21-60.60 NOM 0	56.21	60.60	20/45	3.0	93.00	47.00	TS-I16
DSC-E1 56.21-60.60 NOM 2	56.21	60.60	20/45	3.0	93.00	47.00	TS-I16
DSC-E1 60.61-65.00 NOM 0	60.61	65.00	20/45	3.0	93.00	51.00	TS-I17
DSC-E1 60.61-65.00 NOM 2	60.61	65.00	20/45	3.0	93.00	51.00	TS-I17

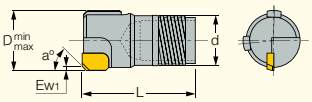
• The drill tip is supplied in a grade that is suitable to machine the material group which is indicated in the drill head designation: P-Steel, M-Stainless Steel, K-Cast Iron • For quotation form and user guide, see pages 630-647 • Ordering example: DSC-E1 42.20 45-P0
(1) Tube designation

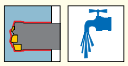
For holders, see pages: TS-I** (626)

ISCARDEEPDRILL

DST-E1

Deep Single Tube Counterborer with Through Hole, External 4 Start Thread and a Brazed Tip





NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head.

Designation	D min	D max	a°	Ew1	L	d	Ts(1)
DST-E1 18.91-20.00 NOM 0	18.91	20.00	20/45	1.0	57.00	15.50	TS-I3
DST-E1 18.91-20.00 NOM 2	18.91	20.00	20/45	1.0	57.00	15.50	TS-I3
DST-E1 20.01-21.80 NOM 0	20.01	21.80	20/45	2.0	65.00	16.00	TS-I4
DST-E1 20.01-21.80 NOM 2	20.01	21.80	20/45	2.0	65.00	16.00	TS-I4
DST-E1 21.81-24.10 NOM 0	21.81	24.10	20/45	2.0	65.00	18.00	TS-I5
DST-E1 21.81-24.10 NOM 2	21.81	24.10	20/45	2.0	65.00	18.00	TS-I5
DST-E1 24.11-26.40 NOM 0	24.11	26.40	20/45	2.0	65.00	19.50	TS-I6
DST-E1 24.11-26.40 NOM 2	24.11	26.40	20/45	2.0	65.00	19.50	TS-I6
DST-E1 26.41-28.70 NOM 0	26.41	28.70	20/45	2.0	65.00	21.00	TS-I7
DST-E1 26.41-28.70 NOM 2	26.41	28.70	20/45	2.0	65.00	21.00	TS-I7
DST-E1 28.71-31.00 NOM 0	28.71	31.00	20/45	2.0	70.00	23.50	TS-I8
DST-E1 28.71-31.00 NOM 2	28.71	31.00	20/45	2.0	70.00	23.50	TS-I8
DST-E1 31.01-33.30 NOM 0	31.01	33.30	20/45	3.0	70.00	25.50	TS-I9
DST-E1 31.01-33.30 NOM 2	31.01	33.30	20/45	3.0	70.00	25.50	TS-I9
DST-E1 33.31-36.20 NOM 0	33.31	36.20	20/45	3.0	70.00	28.00	TS-I10
DST-E1 33.31-36.20 NOM 2	33.31	36.20	20/45	3.0	70.00	28.00	TS-I10
DST-E1 36.21-39.60 NOM 0	36.21	39.60	20/45	3.0	82.00	30.00	TS-I11
DST-E1 36.21-39.60 NOM 2	36.21	39.60	20/45	3.0	82.00	30.00	TS-I11
DST-E1 39.61-43.00 NOM 0	39.61	43.00	20/45	3.0	82.00	33.00	TS-I12
DST-E1 39.61-43.00 NOM 2	39.61	43.00	20/45	3.0	82.00	33.00	TS-I12
DST-E1 43.01-47.00 NOM 0	43.01	47.00	20/45	3.0	82.00	36.00	TS-I13
DST-E1 43.01-47.00 NOM 2	43.01	47.00	20/45	3.0	82.00	36.00	TS-I13
DST-E1 47.01-51.70 NOM 0	47.01	51.70	20/45	3.0	82.00	39.00	TS-I14
DST-E1 47.01-51.70 NOM 2	47.01	51.70	20/45	3.0	82.00	39.00	TS-I14
DST-E1 51.71-56.20 NOM 0	51.71	56.20	20/45	3.0	93.00	43.00	TS-I15
DST-E1 51.71-56.20 NOM 2	51.71	56.20	20/45	3.0	93.00	43.00	TS-I15
DST-E1 56.21-60.60 NOM 0	56.21	60.60	20/45	3.0	93.00	47.00	TS-I16
DST-E1 56.21-60.60 NOM 2	56.21	60.60	20/45	3.0	93.00	47.00	TS-I16
DST-E1 60.61-65.00 NOM 0	60.61	65.00	20/45	3.0	93.00	51.00	TS-I17
DST-E1 60.61-65.00 NOM 2	60.61	65.00	20/45	3.0	93.00	51.00	TS-I17

• The drill tip is supplied in a grade that is suitable to machine the material group which is indicated in the drill head designation: P-Steel, M-Stainless Steel, K-Cast Iron • For quotation form and user guide, see pages 630-647 • Ordering example: DST-E1 42.20 45-P0

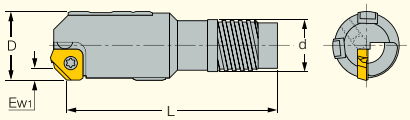
(1) Tube designation

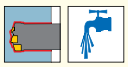
For holders, see pages: TS-I** (626)

ISCARDEEPDRILL

DSC-EA

Deep Single Tube Counterborer with Through Hole, External 4 Start Thread and Adjustable Diameter





Designation	D min	D max	Ew1	L	d	Ts(1)
DSC-EA 25.00-26.40	25.00	26.40	3.5	70.00	19.50	TS-I6
DSC-EA 26.41-28.70	26.41	28.70	3.5	70.00	21.00	TS-I7
DSC-EA 28.71-31.00	28.71	31.00	3.5	75.00	23.50	TS-I8
DSC-EA 31.01-33.30	31.01	33.30	3.5	75.00	25.50	TS-I9
DSC-EA 33.31-36.20	33.31	36.20	3.5	75.00	28.00	TS-I10
DSC-EA 36.21-39.60	36.21	39.60	3.5	90.00	30.00	TS-I11
DSC-EA 39.61-39.99	39.61	39.99	3.5	90.00	33.00	TS-I12

• For spare parts and insert information, see page 616 • For user guide and quotation form, see pages 630-647 • Ordering example: DSC-EA 033.20

(1) Tube designation

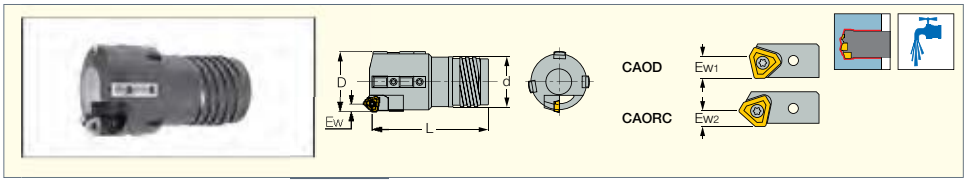
For inserts, see pages: XPMT-45 (620)

For holders, see pages: TS-I** (626)

ISCARDEEPDRILL

DSC-EC

Deep Single Tube Counterborer with Through Hole, External 4 Start Thread and a Cartridge



Designation	D min	D max	Ew1	Ew2	L	d	Ts(1)
DSC-EC 40.00-43.00	40.00	43.00	6.4	4.0	90.00	33.00	TS-I12
DSC-EC 43.01-47.00	43.01	47.00	6.4	4.0	95.00	36.00	TS-I13
DSC-EC 47.01-51.70	47.01	51.70	6.4	4.0	100.00	39.00	TS-I14
DSC-EC 51.71-56.20	51.71	56.20	6.4	4.0	100.00	43.00	TS-I15
DSC-EC 56.21-60.60	56.21	60.60	7.2	4.8	105.00	47.00	TS-I16
DSC-EC 60.61-65.00	60.61	65.00	7.2	4.8	110.00	51.00	TS-I17
DSC-EC 65.00-66.99	65.00	66.99	7.2	4.8	150.00	52.00	TS-I18
DSC-EC 67.00-72.99	67.00	72.99	10.4	6.4	150.00	58.00	TS-I19
DSC-EC 73.00-79.99	73.00	79.99	10.4	6.4	150.00	63.00	TS-I20
DSC-EC 80.00-86.99	80.00	86.99	10.4	6.4	180.00	70.00	TS-I21
DSC-EC 87.00-99.99	87.00	99.99	10.4	6.4	180.00	77.00	TS-I22

• CAOD - Rough boring cartridge (for large D.O.C.), supplied with the cartridge, unless ordered differently • CAORC - Precision boring cartridge • For spare parts and insert information, see page 617 • For quotation form and user guide, see pages 630-647

(1) Tube designation

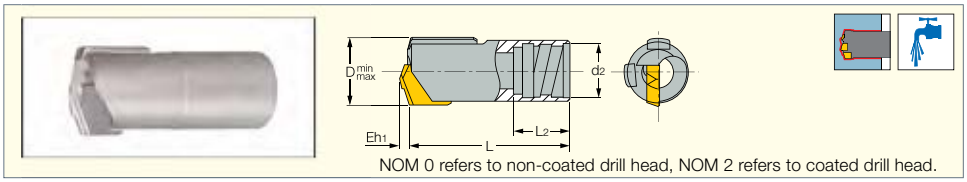
For inserts, see pages: TPMX (619) • XPMT-45 (620)

For holders, see pages: TS-I** (626)

ISCARDEEPDRILL

DSD-I1

Deep Single Tube Drills with Internal Single Start Thread and a Brazed Tip



NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head.

Designation	D min	D max	L	L2	d2	Eh1	Ts(1)
DSD-I1 14.51-15.00 NOM 0	14.51	15.00	52.00	22.00	11.50	2.20	TS-O0
DSD-I1 14.51-15.00 NOM 2	14.51	15.00	52.00	22.00	11.50	2.20	TS-O0
DSD-I1 15.01-15.50 NOM 0	15.01	15.50	52.30	22.80	11.80	2.30	TS-O1
DSD-I1 15.01-15.50 NOM 2	15.01	15.50	52.30	22.80	11.80	2.30	TS-O1
DSD-I1 15.51-16.00 NOM 0	15.51	16.00	52.30	22.80	12.40	2.30	TS-O2
DSD-I1 15.51-16.00 NOM 2	15.51	16.00	52.30	22.80	12.40	2.30	TS-O2
DSD-I1 16.01-16.50 NOM 0	16.01	16.50	52.40	22.80	12.70	2.40	TS-O3
DSD-I1 16.01-16.50 NOM 2	16.01	16.50	52.40	22.80	12.70	2.40	TS-O3
DSD-I1 16.51-17.25 NOM 0	16.51	17.25	52.70	22.80	13.40	2.70	TS-O4
DSD-I1 16.51-17.25 NOM 2	16.51	17.25	52.70	22.80	13.40	2.70	TS-O4
DSD-I1 17.26-18.00 NOM 0	17.26	18.00	52.70	22.80	13.70	2.70	TS-O5
DSD-I1 17.26-18.00 NOM 2	17.26	18.00	52.70	22.80	13.70	2.70	TS-O5
DSD-I1 18.01-19.00 NOM 0	18.01	19.00	52.80	22.80	14.40	2.80	TS-O6
DSD-I1 18.01-19.00 NOM 2	18.01	19.00	52.80	22.80	14.40	2.80	TS-O6
DSD-I1 19.01-19.99 NOM 0	19.01	19.99	52.90	22.80	15.40	2.90	TS-O7
DSD-I1 19.01-19.99 NOM 2	19.01	19.99	52.90	22.80	15.40	2.90	TS-O7
DSD-I1 20.00-21.99 NOM 0	20.00	21.99	62.10	25.00	16.50	3.10	TS-O8
DSD-I1 20.00-21.99 NOM 2	20.00	21.99	62.10	25.00	16.50	3.10	TS-O8
DSD-I1 22.00-24.99 NOM 0	22.00	24.99	62.40	25.00	19.00	3.40	TS-O9
DSD-I1 22.00-24.99 NOM 2	22.00	24.99	62.40	25.00	19.00	3.40	TS-O9
DSD-I1 25.00-26.99 NOM 0	25.00	26.99	69.70	25.00	20.00	3.70	TS-O10
DSD-I1 25.00-26.99 NOM 2	25.00	26.99	69.70	25.00	20.00	3.70	TS-O10
DSD-I1 27.00-29.99 NOM 0	27.00	29.99	70.00	25.00	22.00	4.00	TS-O11
DSD-I1 27.00-29.99 NOM 2	27.00	29.99	70.00	25.00	22.00	4.00	TS-O11
DSD-I1 30.00-31.99 NOM 0	30.00	31.99	75.40	25.00	24.00	4.40	TS-O12
DSD-I1 30.00-31.99 NOM 2	30.00	31.99	75.40	25.00	24.00	4.40	TS-O12
DSD-I1 32.00-33.99 NOM 0	32.00	33.99	85.60	25.00	26.00	4.60	TS-O13
DSD-I1 32.00-33.99 NOM 2	32.00	33.99	85.60	25.00	26.00	4.60	TS-O13
DSD-I1 34.00-36.99 NOM 0	34.00	36.99	86.00	40.00	27.00	5.00	TS-O14
DSD-I1 34.00-36.99 NOM 2	34.00	36.99	86.00	40.00	27.00	5.00	TS-O14
DSD-I1 37.00-39.99 NOM 0	37.00	39.99	86.20	40.00	30.00	5.20	TS-O15
DSD-I1 37.00-39.99 NOM 2	37.00	39.99	86.20	40.00	30.00	5.20	TS-O15
DSD-I1 40.00-43.99 NOM 0	40.00	43.99	86.60	40.00	33.00	5.10	TS-O16
DSD-I1 40.00-43.99 NOM 2	40.00	43.99	86.60	40.00	33.00	5.10	TS-O16
DSD-I1 44.00-46.99 NOM 0	44.00	46.99	97.00	40.00	37.00	5.50	TS-O17
DSD-I1 44.00-46.99 NOM 2	44.00	46.99	97.00	40.00	37.00	5.50	TS-O17
DSD-I1 47.00-51.99 NOM 0	47.00	51.99	97.40	40.00	41.00	5.90	TS-O18
DSD-I1 47.00-51.99 NOM 2	47.00	51.99	97.40	40.00	41.00	5.90	TS-O18
DSD-I1 52.00-56.99 NOM 0	52.00	56.99	97.70	40.00	44.00	6.20	TS-O19
DSD-I1 52.00-56.99 NOM 2	52.00	56.99	97.70	40.00	44.00	6.20	TS-O19
DSD-I1 57.00-60.99 NOM 0	57.00	60.99	98.20	40.00	49.00	6.70	TS-O20
DSD-I1 57.00-60.99 NOM 2	57.00	60.99	98.20	40.00	49.00	6.70	TS-O20
DSD-I1 61.00-65.00 NOM 0	61.00	65.00	98.70	40.00	53.00	7.20	TS-O21
DSD-I1 61.00-65.00 NOM 2	61.00	65.00	98.70	40.00	53.00	7.20	TS-O21

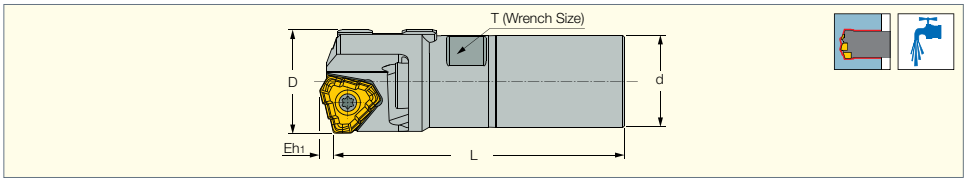
• The drill tip is supplied in a grade that is suitable to machine the material group indicated in the drill head designation: P-Steel, M-Stainless Steel, K-Cast Iron • For quotation form and user guide, see pages 630-647 • Ordering example: DSD-I1 38.20 DT-P0

(1) Tube designation

For holders, see pages: TS-O** (627)

TRIDEEP

DSD-IF-FT
Deep Single Tube Drills with Internal Single Start Thread Carrying Triangular Inserts

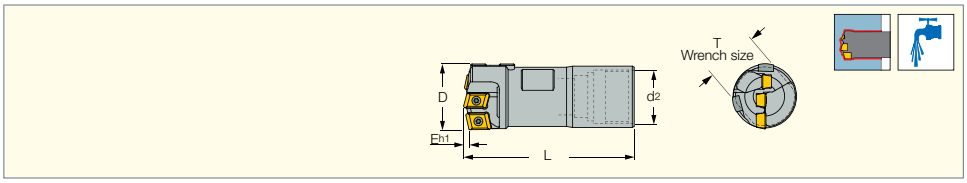


Designation	D min	D max	L	Eh1	d	Ts(1)
DSD-IF 16.01-16.50-FT	16.00	16.50	53.50	2.20	12.70	TS-03
DSD-IF 16.51-17.25-FT	16.51	17.25	53.50	2.20	13.40	TS-04
DSD-IF 17.26-18.00-FT	17.26	18.00	53.50	2.20	13.70	TS-05
DSD-IF 18.01-19.00-FT	18.01	19.00	53.50	3.00	14.40	TS-06
DSD-IF 19.01-19.99-FT	19.01	19.99	53.50	3.20	15.40	TS-07
DSD-IF 20.00-21.99-FT	20.00	21.99	58.00	3.20	16.50	TS-08
DSD-IF 22.00-24.99-FT	22.00	24.99	60.00	3.40	19.00	TS-09
DSD-IF 25.00-26.99-FT	25.00	26.99	65.00	3.60	20.00	TS-10
DSD-IF 27.00-28.00-FT	27.00	28.00	65.00	3.60	22.00	TS-11

• Note: Each item in the attached catalog page represents a diameter range • For spare parts, insert information and user guide, see pages 616, 630-647
• Inserts and guide pads should be ordered separately • Ordering example: DSD-IF 018.50-FT
(1) Tube designation
For inserts, see pages: TOGT (650)

FINEBEAM

DSD-IF-FB
Deep Single Tube Drills with Internal Single Start Thread

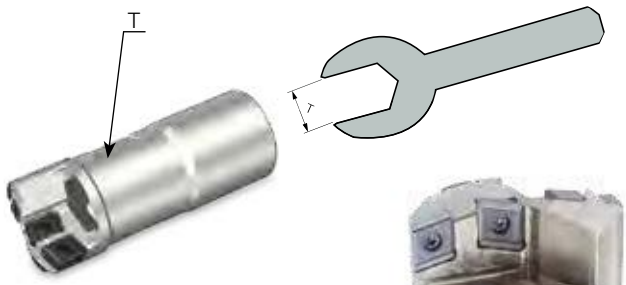


Designation	D min	D max	L	Eh1	d2	Ts(1)
DSD-IF 25.00-26.99-FB	25.00	26.99	70.00	3.00	20.00	TS-010
DSD-IF 27.00-29.00-FB	27.00	29.00	70.00	3.00	22.00	TS-011
DSD-IF 29.01-29.99-FB	29.01	29.99	70.00	3.00	22.00	TS-011
DSD-IF 30.00-31.99-FB	30.00	31.99	75.00	3.00	24.00	TS-012
DSD-IF 32.00-33.99-FB	32.00	33.99	75.00	3.00	26.00	TS-013
DSD-IF 34.00-36.99-FB	34.00	36.99	90.00	3.00	27.00	TS-014
DSD-IF 37.00-39.99-FB	37.00	39.99	95.00	3.00	30.00	TS-015
DSD-IF 40.00-43.99-FB	40.00	43.99	100.00	4.00	33.00	TS-016
DSD-IF 44.00-46.99-FB	44.00	46.99	105.00	4.00	37.00	TS-017
DSD-IF 47.00-51.99-FB	47.00	51.99	105.00	4.00	41.00	TS-018
DSD-IF 52.00-56.99-FB	52.00	56.99	110.00	4.00	44.00	TS-019
DSD-IF 57.00-60.99-FB	57.00	60.99	115.00	5.00	49.00	TS-020
DSD-IF 61.00-65.00-FB	61.00	65.00	115.00	5.00	53.00	TS-021

• For spare parts and insert information, see page 616 • For user guide and quotation form, see pages 630-647 • Inserts and guide pads should be ordered separately • Ordering example: DSD-IF 043.10-FB
(1) Tube designation
For inserts, see pages: NPHT-RG (622) • NPMT-L2/R2 (621)

Wrench Size

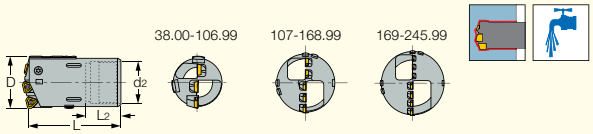
Diameter Dc (mm)	Wrench size T (mm)
25.00 -26.40	19
26.41 -28.70	21
28.71 -31.00	24
31.01 -33.30	26
33.31 -36.20	28
36.21 -39.60	30
39.61 -43.00	32
43.01 -47.00	36
47.01 -51.70	38
51.71 -56.20	46
56.21 -60.60	50
60.61-65.00	54



ISCARDEEPDRILL

DSD-IC

Deep Single Tube Drills with Internal Single Start Thread and Cartridges



Designation	D min	D max	L	L_2	d_2	Ts(1)
DSD-IC 38.00-39.99	38.00	39.99	80.00	40.00	30.00	TS-O15
DSD-IC 40.00-43.99	40.00	43.99	80.00	40.00	33.00	TS-O16
DSD-IC 44.00-46.99	44.00	46.99	90.00	40.00	37.00	TS-O17
DSD-IC 47.00-51.99	47.00	51.99	90.00	40.00	41.00	TS-O18
DSD-IC 52.00-56.99	52.00	56.99	100.00	40.00	44.00	TS-O19
DSD-IC 57.00-60.99	57.00	60.99	110.00	40.00	49.00	TS-O20
DSD-IC 61.00-67.99	61.00	67.99	110.00	40.00	53.00	TS-O21
DSD-IC 68.00-74.99	68.00	74.99	120.00	40.00	59.00	TS-O22
DSD-IC 75.00-80.99	75.00	80.99	150.00	70.00	65.00	TS-O23
DSD-IC 81.00-90.99	81.00	90.99	150.00	70.00	71.00	TS-O24
DSD-IC 91.00-98.99	91.00	98.99	150.00	70.00	79.00	TS-O25
DSD-IC 99.00-106.99	99.00	106.99	150.00	70.00	90.00	TS-O26
DSD-IC 107.00-110.99	107.00	110.99	150.00	70.00	90.00	TS-O26
DSD-IC 111.00-122.99	111.00	122.99	150.00	70.00	102.00	TS-O27
DSD-IC 123.00-134.99	123.00	134.99	150.00	70.00	114.00	TS-O28
DSD-IC 135.00-148.99	135.00	148.99	150.00	70.00	126.00	TS-O29
DSD-IC 149.00-161.99	149.00	161.99	150.00	70.00	139.00	TS-O30
DSD-IC 162.00-168.99	162.00	168.99	190.00	85.00	151.00	TS-O31
DSD-IC 169.00-173.99	169.00	173.99	190.00	85.00	151.00	TS-O31
DSD-IC 174.00-185.99	174.00	185.99	190.00	85.00	163.00	TS-O32
DSD-IC 186.00-197.99	186.00	197.99	190.00	85.00	175.00	TS-O33
DSD-IC 198.00-209.99	198.00	209.99	190.00	85.00	187.00	TS-O34
DSD-IC 210.00-221.99	210.00	221.99	190.00	85.00	199.00	TS-O35
DSD-IC 222.00-233.99	222.00	233.99	190.00	85.00	211.00	TS-O36
DSD-IC 234.00-245.99	234.00	245.99	190.00	85.00	223.00	TS-O37

• **Important:** The specified drilling range using the original outer cartridge and pad may be enlarged by using optional outer cartridges and pads as specified on page
• For spare parts and insert information, see page 618 • For user guide and quotation form, see pages 630-647

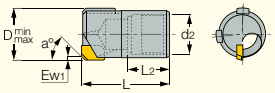
(1) Tube designation

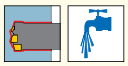
For inserts, see pages: NPMX 0802 RG (619) • NPMX 0803 RB/RG (621) • TPMX (619)

ISCARDEEPDRILL

DSC-I1

Deep Single Tube Counterborer with Through Hole, Internal Single Start Thread and a Brazed Tip





NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head.

Designation	D min	D max	a°	Ew1	L	L2	d2	Ts(1)
DSC-I1 14.51-15.00 NOM 0	14.51	15.00	20/45	3.0	52.00	23.00	11.50	TS-O0
DSC-I1 14.51-15.00 NOM 2	14.51	15.00	20/45	3.0	52.00	23.00	11.50	TS-O0
DSC-I1 15.01-15.50 NOM 0	15.01	15.50	20/45	3.0	52.00	23.00	11.80	TS-O1
DSC-I1 15.01-15.50 NOM 2	15.01	15.50	20/45	3.0	52.00	23.00	11.80	TS-O1
DSC-I1 15.51-16.00 NOM 0	15.51	16.00	20/45	3.0	52.00	23.00	12.40	TS-O2
DSC-I1 15.51-16.00 NOM 2	15.51	16.00	20/45	3.0	52.00	23.00	12.40	TS-O2
DSC-I1 16.01-16.50 NOM 0	16.01	16.50	20/45	3.0	52.00	23.00	12.70	TS-O3
DSC-I1 16.01-16.50 NOM 2	16.01	16.50	20/45	3.0	52.00	23.00	12.70	TS-O3
DSC-I1 16.51-17.25 NOM 0	16.51	17.25	20/45	3.0	52.00	23.00	13.40	TS-O4
DSC-I1 16.51-17.25 NOM 2	16.51	17.25	20/45	3.0	52.00	23.00	13.40	TS-O4
DSC-I1 17.26-18.00 NOM 0	17.26	18.00	20/45	3.0	52.00	23.00	13.70	TS-O5
DSC-I1 17.26-18.00 NOM 2	17.26	18.00	20/45	3.0	52.00	23.00	13.70	TS-O5
DSC-I1 18.01-19.00 NOM 0	18.01	19.00	20/45	3.0	52.00	23.00	14.40	TS-O6
DSC-I1 18.01-19.00 NOM 2	18.01	19.00	20/45	3.0	52.00	23.00	14.40	TS-O6
DSC-I1 19.01-19.99 NOM 0	19.01	19.99	20/45	3.0	52.00	23.00	15.40	TS-O7
DSC-I1 19.01-19.99 NOM 2	19.01	19.99	20/45	3.0	52.00	23.00	15.40	TS-O7
DSC-I1 20.00-21.99 NOM 0	20.00	21.99	20/45	3.0	57.00	25.00	16.50	TS-O8
DSC-I1 20.00-21.99 NOM 2	20.00	21.99	20/45	3.0	57.00	25.00	16.50	TS-O8
DSC-I1 22.00-24.99 NOM 0	22.00	24.99	20/45	3.0	57.00	25.00	19.00	TS-O9
DSC-I1 22.00-24.99 NOM 2	22.00	24.99	20/45	3.0	57.00	25.00	19.00	TS-O9
DSC-I1 25.00-26.99 NOM 0	25.00	26.99	20/45	3.0	67.00	25.00	20.00	TS-O10
DSC-I1 25.00-26.99 NOM 2	25.00	26.99	20/45	3.0	67.00	25.00	20.00	TS-O10
DSC-I1 27.00-29.99 NOM 0	27.00	29.99	20/45	3.0	67.00	25.00	22.00	TS-O11
DSC-I1 27.00-29.99 NOM 2	27.00	29.99	20/45	3.0	67.00	25.00	22.00	TS-O11
DSC-I1 30.00-31.99 NOM 0	30.00	31.99	20/45	3.0	67.00	25.00	24.00	TS-O12
DSC-I1 30.00-31.99 NOM 2	30.00	31.99	20/45	3.0	67.00	25.00	24.00	TS-O12
DSC-I1 32.00-33.99 NOM 0	32.00	33.99	20/45	3.0	67.00	25.00	26.00	TS-O13
DSC-I1 32.00-33.99 NOM 2	32.00	33.99	20/45	3.0	67.00	25.00	26.00	TS-O13
DSC-I1 34.00-36.99 NOM 0	34.00	36.99	20/45	3.0	80.00	40.00	27.00	TS-O14
DSC-I1 34.00-36.99 NOM 2	34.00	36.99	20/45	3.0	80.00	40.00	27.00	TS-O14
DSC-I1 37.00-39.99 NOM 0	37.00	39.99	20/45	3.0	80.00	40.00	30.00	TS-O15
DSC-I1 37.00-39.99 NOM 2	37.00	39.99	20/45	3.0	80.00	40.00	30.00	TS-O15
DSC-I1 40.00-43.99 NOM 0	40.00	43.99	20/45	3.0	80.00	40.00	33.00	TS-O16
DSC-I1 40.00-43.99 NOM 2	40.00	43.99	20/45	3.0	80.00	40.00	33.00	TS-O16
DSC-I1 44.00-46.99 NOM 0	44.00	46.99	20/45	3.0	90.00	40.00	37.00	TS-O17
DSC-I1 44.00-46.99 NOM 2	44.00	46.99	20/45	3.0	90.00	40.00	37.00	TS-O17
DSC-I1 47.00-51.99 NOM 0	47.00	51.99	20/45	5.0	90.00	40.00	41.00	TS-O18
DSC-I1 47.00-51.99 NOM 2	47.00	51.99	20/45	5.0	90.00	40.00	41.00	TS-O18
DSC-I1 52.00-56.99 NOM 0	52.00	56.99	20/45	5.0	90.00	40.00	44.00	TS-O19
DSC-I1 52.00-56.99 NOM 2	52.00	56.99	20/45	5.0	90.00	40.00	44.00	TS-O19
DSC-I1 57.00-60.99 NOM 0	57.00	60.99	20/45	5.0	90.00	40.00	49.00	TS-O20
DSC-I1 57.00-60.99 NOM 2	57.00	60.99	20/45	5.0	90.00	40.00	49.00	TS-O20
DSC-I1 61.00-65.00 NOM 0	61.00	65.00	20/45	5.0	90.00	40.00	53.00	TS-O21
DSC-I1 61.00-65.00 NOM 2	61.00	65.00	20/45	5.0	90.00	40.00	53.00	TS-O21

• The drill tip is supplied in a grade that is suitable to machine the material group indicated in the drill head designation: P-Steel, M-Stainless Steel, K-Cast Iron

• For quotation form and user guide, see pages 630-647 • Ordering example: DSC-I1 25.10 45-P0

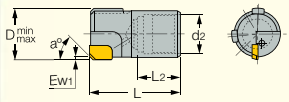
(1) Tube designation

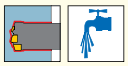
For holders, see pages: TS-O** (627)

ISCARDEEPDRILL

DST-I1

Deep Single Tube Counterborer Without a Through Hole, Internal Single Start Thread and a Brazed Tip





NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head.

Designation	D min	D max	a°	Ew1	L	L2	d2	Ts(1)
DST-I1 14.51-15.00 NOM 0	14.51	15.00	20/45	3.0	52.00	23.00	11.50	TS-00
DST-I1 14.51-15.00 NOM 2	14.51	15.00	20/45	3.0	52.00	23.00	11.50	TS-00
DST-I1 15.01-15.50 NOM 0	15.01	15.50	20/45	3.0	52.00	23.00	11.80	TS-01
DST-I1 15.01-15.50 NOM 2	15.01	15.50	20/45	3.0	52.00	23.00	11.80	TS-01
DST-I1 15.51-16.00 NOM 0	15.51	16.00	20/45	3.0	52.00	23.00	12.40	TS-02
DST-I1 15.51-16.00 NOM 2	15.51	16.00	20/45	3.0	52.00	23.00	12.40	TS-02
DST-I1 16.01-16.50 NOM 0	16.01	16.50	20/45	3.0	52.00	23.00	12.70	TS-03
DST-I1 16.01-16.50 NOM 2	16.01	16.50	20/45	3.0	52.00	23.00	12.70	TS-03
DST-I1 16.51-17.25 NOM 0	16.51	17.25	20/45	3.0	52.00	23.00	13.40	TS-04
DST-I1 16.51-17.25 NOM 2	16.51	17.25	20/45	3.0	52.00	23.00	13.40	TS-04
DST-I1 17.26-18.00 NOM 0	17.26	18.00	20/45	3.0	52.00	23.00	13.70	TS-05
DST-I1 17.26-18.00 NOM 2	17.26	18.00	20/45	3.0	52.00	23.00	13.70	TS-05
DST-I1 18.01-19.00 NOM 0	18.01	19.00	20/45	3.0	52.00	23.00	14.40	TS-06
DST-I1 18.01-19.00 NOM 2	18.01	19.00	20/45	3.0	52.00	23.00	14.40	TS-06
DST-I1 19.01-19.99 NOM 0	19.01	19.99	20/45	3.0	52.00	23.00	15.40	TS-07
DST-I1 19.01-19.99 NOM 2	19.01	19.99	20/45	3.0	52.00	23.00	15.40	TS-07
DST-I1 20.00-21.99 NOM 0	20.00	21.99	20/45	3.0	57.00	25.00	16.50	TS-08
DST-I1 20.00-21.99 NOM 2	20.00	21.99	20/45	3.0	57.00	25.00	16.50	TS-08
DST-I1 22.00-24.99 NOM 0	22.00	24.99	20/45	3.0	57.00	25.00	19.00	TS-09
DST-I1 22.00-24.99 NOM 2	22.00	24.99	20/45	3.0	57.00	25.00	19.00	TS-09
DST-I1 25.00-26.99 NOM 0	25.00	26.99	20/45	3.0	67.00	25.00	20.00	TS-010
DST-I1 25.00-26.99 NOM 2	25.00	26.99	20/45	3.0	67.00	25.00	20.00	TS-010
DST-I1 27.00-29.99 NOM 0	27.00	29.99	20/45	3.0	67.00	25.00	22.00	TS-011
DST-I1 27.00-29.99 NOM 2	27.00	29.99	20/45	3.0	67.00	25.00	22.00	TS-011
DST-I1 30.00-31.99 NOM 0	30.00	31.99	20/45	3.0	67.00	25.00	24.00	TS-012
DST-I1 30.00-31.99 NOM 2	30.00	31.99	20/45	3.0	67.00	25.00	24.00	TS-012
DST-I1 32.00-33.99 NOM 0	32.00	33.99	20/45	3.0	67.00	25.00	26.00	TS-013
DST-I1 32.00-33.99 NOM 2	32.00	33.99	20/45	3.0	67.00	25.00	26.00	TS-013
DST-I1 34.00-36.99 NOM 0	34.00	36.99	20/45	3.0	80.00	40.00	27.00	TS-014
DST-I1 34.00-36.99 NOM 2	34.00	36.99	20/45	3.0	80.00	40.00	27.00	TS-014
DST-I1 37.00-39.99 NOM 0	37.00	39.99	20/45	3.0	80.00	40.00	30.00	TS-015
DST-I1 37.00-39.99 NOM 2	37.00	39.99	20/45	3.0	80.00	40.00	30.00	TS-015
DST-I1 40.00-43.99 NOM 0	40.00	43.99	20/45	3.0	80.00	40.00	33.00	TS-016
DST-I1 40.00-43.99 NOM 2	40.00	43.99	20/45	3.0	80.00	40.00	33.00	TS-016
DST-I1 44.00-46.99 NOM 0	44.00	46.99	20/45	3.0	90.00	40.00	37.00	TS-017
DST-I1 44.00-46.99 NOM 2	44.00	46.99	20/45	3.0	90.00	40.00	37.00	TS-017
DST-I1 47.00-51.99 NOM 0	47.00	51.99	20/45	5.0	90.00	40.00	41.00	TS-018
DST-I1 47.00-51.99 NOM 2	47.00	51.99	20/45	5.0	90.00	40.00	41.00	TS-018
DST-I1 52.00-56.99 NOM 0	52.00	56.99	20/45	5.0	90.00	40.00	44.00	TS-019
DST-I1 52.00-56.99 NOM 2	52.00	56.99	20/45	5.0	90.00	40.00	44.00	TS-019
DST-I1 57.00-60.99 NOM 0	57.00	60.99	20/45	5.0	90.00	40.00	49.00	TS-020
DST-I1 57.00-60.99 NOM 2	57.00	60.99	20/45	5.0	90.00	40.00	49.00	TS-020
DST-I1 61.00-65.00 NOM 0	61.00	65.00	20/45	5.0	90.00	40.00	53.00	TS-021
DST-I1 61.00-65.00 NOM 2	61.00	65.00	20/45	5.0	90.00	40.00	53.00	TS-021

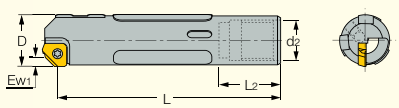
• The drill tip is supplied in a grade that is suitable to machine the material group indicated in the drill head designation: P-Steel, M-Stainless Steel, K-Cast Iron • For quotation form and user guide, see pages 630-647 • Ordering example: DST-I1 25.10 20-P0

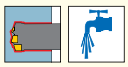
(1) Tube designation

ISCARDEEPDRILL

DSC-IA

Deep Single Tube Counterbore with a Through Hole, Internal Single Start Thread Adjustable Diameter





Designation	D min	D max	Ew1	L	L2	d2	Ts(1)
DSC-IA 25.00-26.99	25.00	26.99	2.8	110.00	25.00	20.00	TS-O10
DSC-IA 27.00-29.99	27.00	29.99	2.8	110.00	25.00	22.00	TS-O11
DSC-IA 30.00-31.99	30.00	31.99	2.8	110.00	25.00	24.00	TS-O12
DSC-IA 32.00-33.99	32.00	33.99	2.8	110.00	25.00	26.00	TS-O13
DSC-IA 34.00-36.99	34.00	36.99	2.8	135.00	40.00	27.00	TS-O14
DSC-IA 37.00-39.99	37.00	39.99	2.8	135.00	40.00	30.00	TS-O15

• For spare parts and insert information, see page 617 • For user guide and quotation form, see pages 630-647 • Ordering example: DSC-IA 30.35

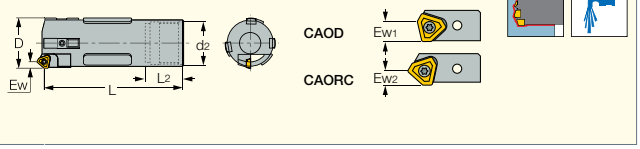
(1) Tube designation

For inserts, see pages: XPMT-45 (620)
For holders, see pages: TS-O** (627)

ISCARDEEPDRILL

DSC-IC

Deep Single Tube Counterborer with a Through Hole, Internal Single Start Thread and a Cartridge



Designation	D min	D max	Ew1	Ew2	L	L2	d	Ts(1)
DSC-IC 40.00-43.99	40.00	43.99	6.4	4.0	135.00	40.00	33.00	TS-O16
DSC-IC 44.00-46.99	44.00	46.99	6.4	4.0	135.00	40.00	37.00	TS-O17
DSC-IC 47.00-51.99	47.00	51.99	6.4	4.0	145.00	40.00	41.00	TS-O18
DSC-IC 52.00-56.99	52.00	56.99	7.2	4.8	145.00	40.00	44.00	TS-O19
DSC-IC 57.00-60.99	57.00	60.99	7.2	4.8	170.00	40.00	49.00	TS-O20
DSC-IC 61.00-67.99	61.00	67.99	7.2	4.8	170.00	40.00	53.00	TS-O21
DSC-IC 68.00-74.99	68.00	74.99	10.4	6.4	170.00	40.00	59.00	TS-O22
DSC-IC 75.00-80.99	75.00	80.99	10.4	6.4	205.00	70.00	65.00	TS-O23
DSC-IC 81.00-90.99	81.00	90.99	10.4	6.4	205.00	70.00	71.00	TS-024
DSC-IC 91.00-98.99	91.00	98.99	10.4	6.4	215.00	70.00	79.00	TS-O25
DSC-IC 99.00-110.99	99.00	110.99	10.4	6.4	225.00	70.00	90.00	TS-O26

• 10OD - Rough boring cartridge (for large D.O.C.) supplied with the cartridge, unless ordered differently • CAORC - Precision boring cartridge • For spare parts and insert information, see page 617 • For user guide and quotation form, see pages 630-647 • Ordering example: DSC-IC 091.10

(1) Tube designation

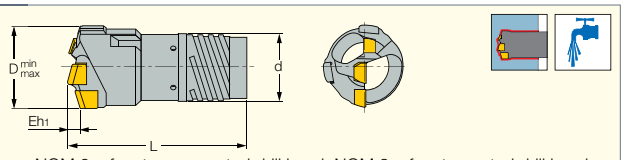
For inserts, see pages: TPMX (619) • XPMT-45 (620)

For holders, see pages: TS-O** (627)

ISCARDEEPDRILL

DDD-E3

Deep Double Tube Drills with External 4 Start Thread and Brazed Tips



Ordering example: DDD-E3 47.10 OT-P0 NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head.

Designation	D min	D max	L	d	Eh1	Ts(1)	Tsi(2)
DDD-E3 18.41-20.00 NOM 0	18.41	20.00	50.00	16.00	2.90	TDO-I0	TDI-N0
DDD-E3 18.41-20.00 NOM 2	18.41	20.00	50.00	16.00	2.90	TDO-I0	TDI-N0
DDD-E3 20.01-21.80 NOM 0	20.01	21.80	56.00	18.00	3.20	TDO-I1	TDI-N1
DDD-E3 20.01-21.80 NOM 2	20.01	21.80	56.00	18.00	3.20	TDO-I1	TDI-N1
DDD-E3 21.81-24.10 NOM 0	21.81	24.10	56.00	19.50	3.20	TDO-I2	TDI-N2
DDD-E3 21.81-24.10 NOM 2	21.81	24.10	56.00	19.50	3.20	TDO-I2	TDI-N2
DDD-E3 24.11-26.40 NOM 0	24.11	26.40	57.50	21.00	3.50	TDO-I3	TDI-N3
DDD-E3 24.11-26.40 NOM 2	24.11	26.40	57.50	21.00	3.50	TDO-I3	TDI-N3
DDD-E3 26.41-28.70 NOM 0	26.41	28.70	60.50	23.50	3.70	TDO-I4	TDI-N4
DDD-E3 26.41-28.70 NOM 2	26.41	28.70	60.50	23.50	3.70	TDO-I4	TDI-N4
DDD-E3 28.71-31.00 NOM 0	28.71	31.00	63.50	25.50	4.00	TDO-I5	TDI-N5
DDD-E3 28.71-31.00 NOM 2	28.71	31.00	63.50	25.50	4.00	TDO-I5	TDI-N5
DDD-E3 31.01-33.30 NOM 0	31.01	33.30	63.50	28.00	4.10	TDO-I6	TDI-N6
DDD-E3 31.01-33.30 NOM 2	31.01	33.30	63.50	28.00	4.10	TDO-I6	TDI-N6
DDD-E3 33.31-36.20 NOM 0	33.31	36.20	70.50	30.00	4.50	TDO-I7	TDI-N7
DDD-E3 33.31-36.20 NOM 2	33.31	36.20	70.50	30.00	4.50	TDO-I7	TDI-N7
DDD-E3 36.21-39.60 NOM 0	36.21	39.60	73.50	33.00	4.80	TDO-I8	TDI-N8
DDD-E3 36.21-39.60 NOM 2	36.21	39.60	73.50	33.00	4.80	TDO-I8	TDI-N8
DDD-E3 39.61-43.00 NOM 0	39.61	43.00	73.50	36.00	5.30	TDO-I9	TDI-N9
DDD-E3 39.61-43.00 NOM 2	39.61	43.00	73.50	36.00	5.30	TDO-I9	TDI-N9
DDD-E3 43.01-47.00 NOM 0	43.01	47.00	75.00	39.00	5.50	TDO-I10	TDI-N10
DDD-E3 43.01-47.00 NOM 2	43.01	47.00	75.00	39.00	5.50	TDO-I10	TDI-N10
DDD-E3 47.01-51.70 NOM 0	47.01	51.70	79.00	43.00	6.10	TDO-I11	TDI-N11
DDD-E3 47.01-51.70 NOM 2	47.01	51.70	79.00	43.00	6.10	TDO-I11	TDI-N11
DDD-E3 51.71-56.20 NOM 0	51.71	56.20	82.00	47.00	6.50	TDO-I12	TDI-N12
DDD-E3 51.71-56.20 NOM 2	51.71	56.20	82.00	47.00	6.50	TDO-I12	TDI-N12
DDD-E3 56.21-65.00 NOM 0	56.21	65.00	84.00	51.00	6.60	TDO-I13	TDI-N13
DDD-E3 56.21-65.00 NOM 2	56.21	65.00	84.00	51.00	6.60	TDO-I13	TDI-N13

• The drill tip is supplied in a grade that is suitable to machine the material group indicated in the drill head designation: ISO P, K, M, N materials • NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head. • Ordering example: DDD-E3 47.10 OT-P0 • For quotation form and user guide, see pages 630-647

(1) Outer tube designation

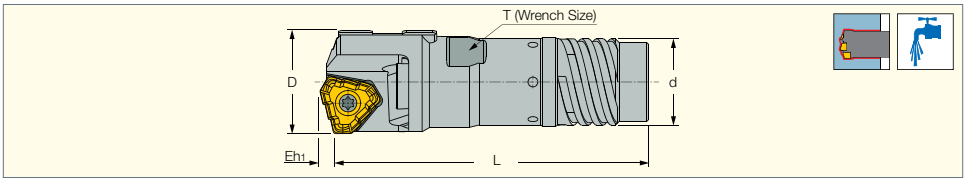
(2) Inner tube designation

For holders, see pages: TDO-I (D18.41-65.00) (629)

TRIDEEP

DDD-EF-FT

Deep Double Tube Drills with External 4 Start Thread Carrying Triangular Inserts



Designation	D min	D max	L	Eh1	d	Ts(1)	Tsi(2)
DDD-EF 18.40-20.00-FT	18.41	20.00	61.00	3.00	16.00	TDO-I0	TDI-N0
DDD-EF 20.01-21.80-FT	20.01	21.80	63.50	3.20	18.00	TDO-I1	TDI-N1
DDD-EF 21.81-21.99-FT	21.81	21.99	63.50	3.20	19.50	TDO-I2	TDI-N2
DDD-EF 22.00-24.10-FT	22.00	24.10	65.50	3.40	19.50	TDO-I2	TDI-N2
DDD-EF 24.11-25.00-FT	24.11	25.00	65.50	3.40	21.00	TDO-I3	TDI-N3
DDD-EF 25.01-26.40-FT	25.01	26.40	67.50	3.60	21.00	TDO-I3	TDI-N3
DDD-EF 26.01-28.00-FT	26.41	28.00	70.50	3.60	23.50	TDO-I4	TDI-N4

• Note: Each item in the attached catalog page represents a diameter range. • For spare parts, insert information and user guide, see pages 616, 630-647
• Inserts and guide pads should be ordered separately • Ordering example: DDD-EF 018.50-FT

(1) Outer tube designation

(2) Inner tube designation

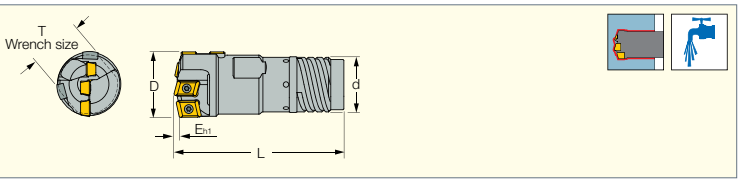
For inserts, see pages: TOGT (650)

For holders, see pages: TDO-I (D18.41-65.00) (629)

FINEBEAM

DDD-EF-FB

Deep Double Tube Drills with External 4 Start Thread for High Feed



Designation	D min	D max	L	Eh1	d	T	Ts(1)	Tsi(2)
DDD-EF 25.00-26.40-FB	25.00	26.40	70.00	3.00	21.00	19.0	TDO-I3	TDI-N3
DDD-EF 26.41-28.70-FB	26.41	28.70	75.00	3.00	23.50	21.0	TDO-I4	TDI-N4
DDD-EF 28.71-31.00-FB	28.71	31.00	75.00	3.00	25.50	24.0	TDO-I5	TDI-N5
DDD-EF 31.01-33.30-FB	31.01	33.30	80.00	3.00	28.00	26.0	TDO-I6	TDI-N6
DDD-EF 33.31-36.20-FB	33.31	36.20	90.00	3.00	30.00	28.0	TDO-I7	TDI-N7
DDD-EF 36.21-39.60-FB	36.21	39.60	95.00	4.00	33.00	30.0	TDO-I8	TDI-N8
DDD-EF 39.61-43.00-FB	39.61	43.00	100.00	4.00	36.00	32.0	TDO-I9	TDI-N9
DDD-EF 43.01-47.00-FB	43.01	47.00	100.00	4.00	39.00	36.0	TDO-I10	TDI-N10
DDD-EF 47.01-51.70-FB	47.01	51.70	110.00	4.00	43.00	38.0	TDO-I11	TDI-N11
DDD-EF 51.71-56.20-FB	51.71	56.20	115.00	5.00	47.00	46.0	TDO-I12	TDI-N12
DDD-EF 56.21-60.60-FB	56.21	60.60	115.00	5.00	51.00	50.0	TDO-I13	TDI-N13
DDD-EF 60.61-65.00-FB	60.61	65.00	115.00	5.00	51.00	54.0	TDO-I13	TDI-N13

• For spare parts and insert information, see page 616 • For user guide and quotation form see pages 630-647 • Inserts and guide pads should be ordered separately • Ordering example: DDD-EF 043.00-FB

(1) Outer tube designation

(2) Inner tube designation

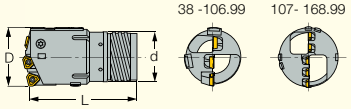
For inserts, see pages: NPHT-RG (622) • NPMT-L2/R2 (621)

For holders, see pages: TDO-I (D18.41-65.00) (629)

ISCARDEEPDRILL

DDD-EC

Deep Double Tube Drills with External 4 Start Thread and Cartridges



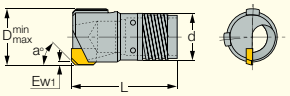
Designation	D min	D max	L	d	Ts(1)	Tsi(2)
DDD-EC 38.00-39.60	38.00	39.60	85.00	33.00	TDO-I8	TDI-N8
DDD-EC 39.61-43.00	39.61	43.00	85.00	36.00	TDO-I9	TDI-N9
DDD-EC 43.01-47.00	43.01	47.00	95.00	39.00	TDO-I10	TDI-N10
DDD-EC 47.01-51.70	47.01	51.70	100.00	43.00	TDO-I11	TDI-N11
DDD-EC 51.71-56.20	51.71	56.20	100.00	47.00	TDO-I12	TDI-N12
DDD-EC 56.21-65.00	56.21	65.00	110.00	51.00	TDO-I13	TDI-N13
DDD-EC 65.00-66.99	65.00	66.99	150.00	52.00	TDO-I14	TDI-N14
DDD-EC 67.00-72.99	67.00	72.99	150.00	58.00	TDO-I15	TDI-N15
DDD-EC 73.00-79.99	73.00	79.99	150.00	63.00	TDO-I16	TDI-N16
DDD-EC 80.00-86.99	80.00	86.99	180.00	70.00	TDO-I17	TDI-N17
DDD-EC 87.00-99.99	87.00	99.99	180.00	77.00	TDO-I18	TDI-N18
DDD-EC 100.00-106.99	100.00	106.99	180.00	89.00	TDO-I19	TDI-N19
DDD-EC 107.00-111.99	107.00	111.99	180.00	89.00	TDO-I20	TDI-N20
DDD-EC 112.00-123.99	112.00	123.99	205.00	101.00	TDO-I21	TDI-N21
DDD-EC 124.00-135.99	124.00	135.99	205.00	113.00	TDO-I22	TDI-N22
DDD-EC 136.00-147.99	136.00	147.99	205.00	125.00	TDO-I23	TDI-N23
DDD-EC 148.00-159.99	148.00	159.99	225.00	137.00	TDO-I24	TDI-N24
DDD-EC 160.00-168.99	160.00	168.99	225.00	149.00	TDO-I25	TDI-N25

• Important: The specified drilling range using the original outer cartridge and pad may be enlarged by using optional outer cartridges and pads as specified on page • For spare parts and insert information, see page 618 • For user guide and quotation form see pages 630-647
• Ordering example: DDD-EC 148.00
(1) Outer tube designation
(2) Inner tube designation
For inserts, see pages: NPMX 0803 RB/RG (621) • TPMX (619)
For holders, see pages: TDO-I (D18.41-65.00) (629) • TDO-I (D65.00-171.99) (629)

ISCARDEEPDRILL

DDC-E1

Deep Double Tube Counterborer with a Through Hole, External 4 Start Thread and a Brazed Tip



NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head.

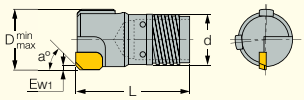
Designation	D min	D max	a°	Ew1	L	d	Ts(1)	Tsi(2)
DDC-E1 18.41-20.00 NOM 0	18.41	20.00	20/45	1.0	57.00	16.00	TDO-I0	TDI-N0
DDC-E1 18.41-20.00 NOM 2	18.41	20.00	20/45	1.0	57.00	16.00	TDO-I0	TDI-N0
DDC-E1 20.01-21.80 NOM 0	20.01	21.80	20/45	2.0	65.00	18.00	TDO-I1	TDI-N1
DDC-E1 20.01-21.80 NOM 2	20.01	21.80	20/45	2.0	65.00	18.00	TDO-I1	TDI-N1
DDC-E1 21.81-24.10 NOM 0	21.81	24.10	20/45	2.0	65.00	19.50	TDO-I2	TDI-N2
DDC-E1 21.81-24.10 NOM 2	21.81	24.10	20/45	2.0	65.00	19.50	TDO-I2	TDI-N2
DDC-E1 24.11-26.40 NOM 0	24.11	26.40	20/45	2.0	65.00	21.00	TDO-I3	TDI-N3
DDC-E1 24.11-26.40 NOM 2	24.11	26.40	20/45	2.0	65.00	21.00	TDO-I3	TDI-N3
DDC-E1 26.41-28.70 NOM 0	26.41	28.70	20/45	2.0	65.00	23.50	TDO-I4	TDI-N4
DDC-E1 26.41-28.70 NOM 2	26.41	28.70	20/45	2.0	65.00	23.50	TDO-I4	TDI-N4
DDC-E1 28.71-31.00 NOM 0	28.71	31.00	20/45	2.0	70.00	25.50	TDO-I5	TDI-N5
DDC-E1 28.71-31.00 NOM 2	28.71	31.00	20/45	2.0	70.00	25.50	TDO-I5	TDI-N5
DDC-E1 31.01-33.30 NOM 0	31.01	33.30	20/45	3.0	70.00	28.00	TDO-I6	TDI-N6
DDC-E1 31.01-33.30 NOM 2	31.01	33.30	20/45	3.0	70.00	28.00	TDO-I6	TDI-N6
DDC-E1 33.31-36.20 NOM 0	33.31	36.20	20/45	3.0	70.00	30.00	TDO-I7	TDI-N7
DDC-E1 33.31-36.20 NOM 2	33.31	36.20	20/45	3.0	70.00	30.00	TDO-I7	TDI-N7
DDC-E1 36.21-39.60 NOM 0	36.21	39.60	20/45	3.0	82.00	33.00	TDO-I8	TDI-N8
DDC-E1 36.21-39.60 NOM 2	36.21	39.60	20/45	3.0	82.00	33.00	TDO-I8	TDI-N8
DDC-E1 39.61-43.00 NOM 0	39.61	43.00	20/45	3.0	82.00	36.00	TDO-I9	TDI-N9
DDC-E1 39.61-43.00 NOM 2	39.61	43.00	20/45	3.0	82.00	36.00	TDO-I9	TDI-N9
DDC-E1 43.01-47.00 NOM 0	43.01	47.00	20/45	3.0	82.00	39.00	TDO-I10	TDI-N10
DDC-E1 43.01-47.00 NOM 2	43.01	47.00	20/45	3.0	82.00	39.00	TDO-I10	TDI-N10
DDC-E1 47.01-51.70 NOM 0	47.01	51.70	20/45	3.0	82.00	43.00	TDO-I11	TDI-N11
DDC-E1 47.01-51.70 NOM 2	47.01	51.70	20/45	3.0	82.00	43.00	TDO-I11	TDI-N11
DDC-E1 51.71-56.20 NOM 0	51.71	56.20	20/45	3.0	93.00	47.00	TDO-I12	TDI-N12
DDC-E1 51.71-56.20 NOM 2	51.71	56.20	20/45	3.0	93.00	47.00	TDO-I12	TDI-N12
DDC-E1 56.21-65.00 NOM 0	56.21	65.00	20/45	3.0	93.00	51.00	TDO-I13	TDI-N13
DDC-E1 56.21-65.00 NOM 2	56.21	65.00	20/45	3.0	93.00	51.00	TDO-I13	TDI-N13

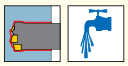
• The drill tip is supplied in a grade that is suitable to machine the material group which is indicated in the drill head designation: P-Steel, M-Stainless Steel, K-Cast Iron • For quotation form and user guide, see pages 630-647 • Ordering example: DDC-E1 36.00 20-P0
(1) Outer tube designation
(2) Inner tube designation
For holders, see pages: TDO-I (D18.41-65.00) (629)

ISCARDEEPDRILL

DDT-E1

Deep Double Tube Counterborer Without a Through Hole, External 4 Start Thread and a Brazed Tip





NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head.

Designation	D min	D max	a°	Ew1	L	d	Ts(1)	Tsi(2)
DDT-E1 18.41-20.00 NOM 0	18.41	20.00	20/45	1.0	57.00	16.00	TDO-I0	TDI-N0
DDT-E1 18.41-20.00 NOM 2	18.41	20.00	20/45	1.0	57.00	16.00	TDO-I0	TDI-N0
DDT-E1 20.01-21.80 NOM 0	20.01	21.80	20/45	2.0	65.00	18.00	TDO-I1	TDI-N1
DDT-E1 20.01-21.80 NOM 2	20.01	21.80	20/45	2.0	65.00	18.00	TDO-I1	TDI-N1
DDT-E1 21.81-24.10 NOM 0	21.81	24.10	20/45	2.0	65.00	19.50	TDO-I2	TDI-N2
DDT-E1 21.81-24.10 NOM 2	21.81	24.10	20/45	2.0	65.00	19.50	TDO-I2	TDI-N2
DDT-E1 24.11-26.40 NOM 0	24.11	26.40	20/45	2.0	65.00	21.00	TDO-I3	TDI-N3
DDT-E1 24.11-26.40 NOM 2	24.11	26.40	20/45	2.0	65.00	21.00	TDO-I3	TDI-N3
DDT-E1 26.41-28.70 NOM 0	26.41	28.70	20/45	2.0	65.00	23.50	TDO-I4	TDI-N4
DDT-E1 26.41-28.70 NOM 2	26.41	28.70	20/45	2.0	65.00	23.50	TDO-I4	TDI-N4
DDT-E1 28.71-31.00 NOM 0	28.71	31.00	20/45	2.0	70.00	25.50	TDO-I5	TDI-N5
DDT-E1 28.71-31.00 NOM 2	28.71	31.00	20/45	2.0	70.00	25.50	TDO-I5	TDI-N5
DDT-E1 31.01-33.30 NOM 0	31.01	33.30	20/45	3.0	70.00	28.00	TDO-I6	TDI-N6
DDT-E1 31.01-33.30 NOM 2	31.01	33.30	20/45	3.0	70.00	28.00	TDO-I6	TDI-N6
DDT-E1 33.31-36.20 NOM 0	33.31	36.20	20/45	3.0	70.00	30.00	TDO-I7	TDI-N7
DDT-E1 33.31-36.20 NOM 2	33.31	36.20	20/45	3.0	70.00	30.00	TDO-I7	TDI-N7
DDT-E1 36.21-39.60 NOM 0	36.21	39.60	20/45	3.0	82.00	33.00	TDO-I8	TDI-N8
DDT-E1 36.21-39.60 NOM 2	36.21	39.60	20/45	3.0	82.00	33.00	TDO-I8	TDI-N8
DDT-E1 39.61-43.00 NOM 0	39.61	43.00	20/45	3.0	82.00	36.00	TDO-I9	TDI-N9
DDT-E1 39.61-43.00 NOM 2	39.61	43.00	20/45	3.0	82.00	36.00	TDO-I9	TDI-N9
DDT-E1 43.01-47.00 NOM 0	43.01	47.00	20/45	3.0	82.00	39.00	TDO-I10	TDI-N10
DDT-E1 43.01-47.00 NOM 2	43.01	47.00	20/45	3.0	82.00	39.00	TDO-I10	TDI-N10
DDT-E1 47.01-51.70 NOM 0	47.01	51.70	20/45	3.0	82.00	43.00	TDO-I11	TDI-N11
DDT-E1 47.01-51.70 NOM 2	47.01	51.70	20/45	3.0	82.00	43.00	TDO-I11	TDI-N11
DDT-E1 51.71-56.20 NOM 0	51.71	56.20	20/45	3.0	93.00	47.00	TDO-I12	TDI-N12
DDT-E1 51.71-56.20 NOM 2	51.71	56.20	20/45	3.0	93.00	47.00	TDO-I12	TDI-N12
DDT-E1 56.21-65.00 NOM 0	56.21	65.00	20/45	3.0	93.00	51.00	TDO-I13	TDI-N13
DDT-E1 56.21-65.00 NOM 2	56.21	65.00	20/45	3.0	93.00	51.00	TDO-I13	TDI-N13

• The drill tip is supplied in a grade that is suitable to machine the material group indicated in the drill head designation: P-Steel, M-Stainless Steel, K-Cast Iron
• For quotation form and user guide, see pages 630-647 • Order example: DDT-E1 036.00 20-PO

(1) Outer tube designation

(2) Inner tube designation

For holders, see pages: TDO-I (D18.41-65.00) (629)

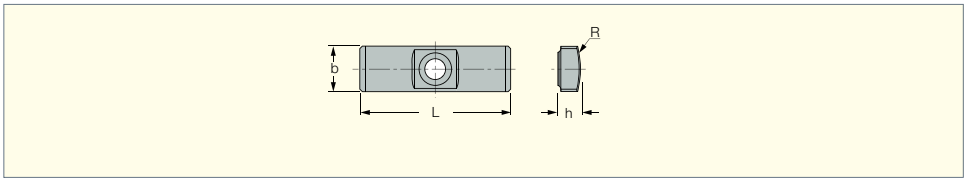
ISCARDEEPDRILL

DDD-EF-FT / DSD-EF-FT / DSD-IF-FT

Diameter Range	Insert	Insert Clamping Screw	Key	Solid Carbide Guide Pad	Guide Pad Clamping Screw	Key
16.00-18.00	TOGT 080305-DT	SR-14-560/S	T-8	GPS-06-20-075	SR34-508	T-7
18.01-20.00	TOGT 090305-DT	SR-14-560/S	T-8	GPS-06-20-085		
20.01-20.99	TOGT 100305-DT	SR-34-506	T-8	GPS-06-20-085		
21.00-21.99	TOGT 100305-DT			GPS-06-20-100		
22.00-25.00	TOGT 110405-DT	SR-14-571/S	T-15	GPS-06-20-100		
25.01-28.00	TOGT 120405-DT	SR-14-506	T-15	GPS-06-20-120		

DSD-EF-FB / DDD-EF-FB / DSD-IF-FB

Drill Diameter	Insert									Guide Pad		
	① Peripheral Insert	Screw	Key	② Inner Insert	Screw	Key	③ Center Insert	Screw	Key	④	Screw	Key
25.00 - 28.00	NPHT 06003RG	SR 11201753-2	T-7/5	NPMT 05503R2	SR 11201753-2	T-7/5	NPMT 05503L2	SR 11201753-2	T-7/5	GPS06	SR 11201753-1	T-7/5
28.01 - 29.99	NPHT 06003RG	SR 11201753-2	T-7/5	NPMT 05503R2	SR 11201753-2	T-7/5	NPMT 06504L2	SR 11201753-2	T-8/5	GPS06	SR 11201753-1	T-7/5
30.00 - 35.00	NPHT 07504RG	SR 11201753-3	T-8/5	NPMT 06504R2	SR 11201753-3	T-8/5	NPMT 06504L2	SR 11201753-3	T-8/5	GPS07	SR 11201753-4	T-9/5
35.01 - 38.00	NPHT 07504RG	SR 11201753-3	T-8/5	NPMT 06504R2	SR 11201753-3	T-8/5	NPMT 0804L2	SR 11201753-3	T-8/5	GPS07	SR 11201753-4	T-9/5
38.01 - 39.00	NPHT 09004RG	SR 11201753-3	T-8/5	NPMT 06504R2	SR 11201753-3	T-8/5	NPMT 0804L2	SR 11201753-3	T-8/5	GPS07	SR 11201753-4	T-9/5
39.01 - 41.00	NPHT 09004RG	SR 11201753-3	T-8/5	NPMT 06504R2	SR 11201753-3	T-8/5	NPMT 0804L2	SR 11201753-3	T-8/5	GPS08	SR 11201753-4	T-9/5
41.01 - 44.00	NPHT 09004RG	SR 11201753-3	T-8/5	NPMT 0804R2	SR 11201753-3	T-8/5	NPMT 0804L2	SR 11201753-3	T-8/5	GPS08	SR 11201753-4	T-9/5
44.01 - 45.00	NPHT 09004RG	SR 11201753-3	T-8/5	NPMT 0804R2	SR 11201753-3	T-8/5	NPMT 09504L2	SR 11201753-3	T-8/5	GPS08	SR 11201753-4	T-9/5
45.01 - 47.00	NPHT 09004RG	SR 11201753-3	T-8/5	NPMT 0804R2	SR 11201753-3	T-8/5	NPMT 09504L2	SR 11201753-3	T-8/5	GPS10	SR 11201753-6	T-15/5
47.01 - 51.00	NPHT 11004RG	SR 11201753-3	T-8/5	NPMT 0804R2	SR 11201753-3	T-8/5	NPMT 09504L2	SR 11201753-3	T-8/5	GPS10	SR 11201753-6	T-15/5
51.01 - 54.00	NPHT 11004RG	SR 11201753-3	T-8/5	NPMT 09504R2	SR 11201753-3	T-8/5	NPMT 09504L2	SR 11201753-3	T-8/5	GPS10	SR 11201753-6	T-15/5
54.01 - 57.00	NPHT 11004RG	SR 11201753-3	T-8/5	NPMT 09504R2	SR 11201753-3	T-8/5	NPMT 12504L2	SR 11201753-3	T-8/5	GPS10	SR 11201753-6	T-15/5
57.01 - 60.00	NPHT 11004RG	SR 11201753-3	T-8/5	NPMT 09504R2	SR 11201753-3	T-8/5	NPMT 12504L2	SR 11201753-3	T-8/5	GPS12	SR 11201753-6	T-15/5
60.01 - 64.00	NPHT 13004RG	SR 11201753-3	T-8/5	NPMT 09504R2	SR 11201753-3	T-8/5	NPMT 12504L2	SR 11201753-3	T-8/5	GPS12	SR 11201753-6	T-15/5
64.01 - 65.00	NPHT 13004RG	SR 11201753-3	T-8/5	NPMT 12504R2	SR 11201753-3	T-8/5	NPMT 12504L2	SR 11201753-3	T-8/5	GPS12	SR 11201753-6	T-15/5



FINEBEAM

Tool Diameter		Dimensions (mm)				Solid Carbide
Min	Max	b	L	R	h	Description
25.00	29.99	6	20	12	3	GPS-06-20-120
30.00	39.00	7	20	12	3.5	GPS-07-20-120
39.01	45.00	8	25	15.5	4.5	GPS-08-25-155
45.01	57.00	10	30	20	4.5	GPS-10-30-200
57.01	65.00	12	35	25	5.5	GPS-12-35-250

DSC-EA

Pg. 625 Pg. 624 Pg. 620

Diameter	Guide Pads (3 pcs)	Guide Pad Protectors (3 pcs)	Close Tolerance Insert	Insert Clamping Screw
25.00-27.99	GPS-06-20-120	GPP-04	XPMT16002-45	SR 11201754-4
28.00-29.99	GPS-06-20-120	GPP-04	XPMT16002-45	SR 11201754-4
30.00-37.99	GPS-07-20-120	GPP-05	XPMT16002-45	SR 11201754-4
38.00-39.99	GPS-08-25-155	GPP-06	XPMT16002-45	SR 11201754-4

DSC-EC







Pg. 623 | Pg. 622 | Pg. 625 | Pg. 624 | Pg. 624 | Pg. 619 | Pg. 619

Diameter	Close Tolerance Cartridge	Normal Tolerance Cartridge	Guide Pads (3 pcs)	Sub Guide Pad (1 pc)	Guide Pad Protectors (3 pcs)	Close Tolerance Insert	Normal Tolerance Insert
40.00-45.99	CAORC-0845	CAOD-0845	GPS-08-25-155	SGP-02	GPP-06	TPMX 1403LG	TPMX 1403RG
46.00-51.99	CAORC-0845	CAOD-0845	GPS-10-35-200	SGP-02	GPP-07	TPMX 1403LG	TPMX 1403RG
52.00-56.99	CAORC-103	CAOD-103	GPS-10-35-200	SGP-02	GPP-07	TPMX 1704LG	TPMX 1704RG
57.00-59.99	CAORC-103	CAOD-103	GPS-10-35-200	SGP-02	GPP-07	TPMX 1704LG	TPMX 1704RG
60.00-66.99	CAORC-103	CAOD-103	GPS-14-40-250	SGP-03	GPP-08	TPMX 1704LG	TPMX 1704RG
67.00-80.99	CAORC-142	CAOD-142	GPS-14-40-250	SGP-03	GPP-08	TPMX 2405LG	TPMX 2405RG
81.00-90.99	CAORC-142	CAOD-142	GPS-14-40-250	SGP-03	GPP-08	TPMX 2405LG	TPMX 2405RG
91.00-99.99	CAORC-142	CAOD-142	GPS-14-40-250	SGP-03	GPP-08	TPMX 2405LG	TPMX 2405RG
100.00-122.99	CAORC-142	CAOD-142	GPS-18-40-300	SGP-04	GPP-09	TPMX 2405LG	TPMX 2405RG

DSC-IA




Pg. 625 | Pg. 624 | Pg. 620

Diameter	Guide Pads (3 pcs)	Resin Guide Pads (3 pcs)	Close Tolerance Insert	Insert Clamping Screw
25.00-27.99	GPS-06-20-120	RGP01	XPMT 16002-45	SR 11201754-4
28.00-29.99	GPS-06-20-120	RGP02	XPMT 16002-45	SR 11201754-4
30.00-37.99	GPS-07-20-120	RGP02	XPMT 16002-45	SR 11201754-4
38.00-39.99	GPS-08-25-155	RGP03	XPMT 16002-45	SR 11201754-4

DSC-IC






Pg. 623 | Pg. 622 | Pg. 625 | Pg. 624 | Pg. 619 | Pg. 619

Diameter	Close Tolerance Cartridge	Normal Tolerance Cartridge	Guide Pads (3 pcs)	Resin Guide Pads (3 pcs)	Close Tolerance Insert	Normal Tolerance Insert
40.00-45.99	CAORC-0845	CAOD-0845	GPS-08-25-155	RGP03	TPMX 1403LG	TPMX 1403RG
46.00-51.99	CAORC-0845	CAOD-0845	GPS-10-35-200	RGP03	TPMX 1403LG	TPMX 1403RG
52.00-56.99	CAORC-103	CAOD-103	GPS-10-35-200	RGP03	TPMX 1704LG	TPMX 1704RG
57.00-59.99	CAORC-103	CAOD-103	GPS-10-35-200	RGP03	TPMX 1704LG	TPMX 1704RG
60.00-66.99	CAORC-103	CAOD-103	GPS-14-40-250	RGP04	TPMX 1704LG	TPMX 1704RG
67.00-80.99	CAORC-142	CAOD-142	GPS-14-40-250	RGP04	TPMX 2405LG	TPMX 2405RG
81.00-90.99	CAORC-142	CAOD-142	GPS-14-40-250	RGP05	TPMX 2405LG	TPMX 2405RG
91.00-99.99	CAORC-142	CAOD-142	GPS-14-40-250	RGP06	TPMX 2405LG	TPMX 2405RG
100.00-122.99	CAORC-142	CAOD-142	GPS-18-40-300	RGP06	TPMX 2405LG	TPMX 2405RG

ISCARDEEPDRILL

DSD-EC / DDD-EC / DSD-IC

 Pg. 622

 Pg. 622

 Pg. 625

 Pg. 624

 Pg. 625

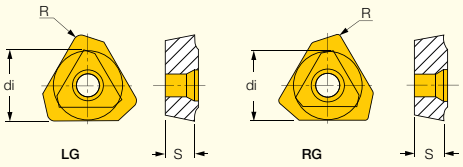
 Pg. 621

 Pg. 621

Diameter	Peripheral	Qty.	Inner/ Central	Qty.	Guide Pad	Qty.	Guide Pad Protectors	Qty.	Sub Guide Pad	Qty.	Peripheral Insert	Qty.	Inner/ Central Insert	Qty.
38.00 - 39.99	CAOD-080	1	CAID-080	2	GPS-08-25-155	2	GPP-06	2	SGP-02	1	NPMX 0803RG	1	NPMX 0803RG	2
40.00-44.99	CAOD-0845	1	CAID-080	2	GPS-08-25-155	2	GPP-06	2	SGP-02	1	TPMX 1403RG	1	NPMX 0803RG	2
45.00-47.99	CAOD-0845	1	CAID-080 CAID-0845	1 1	GPS-10-35-200	2	GPP-07	2	SGP-02	1	TPMX 1403RG	1	NPMX 0803RG TPMX 1403RG	1 1
48.00-51.99	CAOD-0845	1	CAID-0845	2	GPS-10-35-200	2	GPP-07	2	SGP-02	1	TPMX 1403RG	1	TPMX 1403RG	2
52.00-54.99	CAOD-103	1	CAID-0845	2	GPS-10-35-200	2	GPP-07	2	SGP-02	1	TPMX 1704RG	1	TPMX 1403RG	2
55.00-57.99	CAOD-103	1	CAID-0845 CAID-103	1 1	GPS-10-35-200	2	GPP-07	2	SGP-02	1	TPMX 1704RG	1	TPMX 1403RG TPMX 1704RG	1 1
58.00-59.99	CAOD-103	1	CAID-103	2	GPS-10-35-200	2	GPP-07	2	SGP-02	1	TPMX 1704RG	1	TPMX 1704RG	2
60.00-63.99	CAOD-103	1	CAID-103	2	GPS-14-40-250	2	GPP-08	2	SGP-02	1	TPMX 1704RG	1	TPMX 1704RG	2
64.00-67.99	CAOD-142	1	CAID-103	2	GPS-14-40-250	2	GPP-08	2	SGP-03	1	TPMX 2405RG	1	TPMX 1704RG	2
68.00-77.99	CAOD-103	1	CAID-142	2	GPS-14-40-250	2	GPP-08	2	SGP-03	1	TPMX 1704RG	1	TPMX 2405RG	2
78.00-84.99	CAOD-142	1	CAID-142	2	GPS-14-40-250	2	GPP-08	2	SGP-03	1	TPMX 2405RG	1	TPMX 2405RG	2
85.00-91.99	CAOD-170	1	CAID-142	2	GPS-14-40-250	2	GPP-08	2	SGP-03	1	TPMX 2807RG	1	TPMX 2405RG	2
92.00-98.99	CAOD-142	1	CAID-170	2	GPS-14-40-250	2	GPP-08	2	SGP-03	1	TPMX 2405RG	1	TPMX 2807RG	2
99.00-106.99	CAOD-170	1	CAID-170	2	GPS-18-40-300	2	GPP-09	2	SGP-04	1	TPMX 2807RG	1	TPMX 2807RG	2
107.00-117.99	CAOD-142	1	CAID-103 CAID-142	3 1	GPS-18-40-300	2	GPP-09	2	SGP-04	1	TPMX 2405RG	1	TPMX 1704RG TPMX 2405RG	3 1
118.00-135.99	CAOD-142	1	CAID-142	4	GPS-18-40-300	2	GPP-09	2	SGP-04	1	TPMX 2405RG	1	TPMX 2405RG	4
136.00-144.99	CAOD-142	1	CAID-142 CAID-170	3 1	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2405RG	1	TPMX 2405RG TPMX 2807RG	3 1
145.00-150.99	CAOD-142	1	CAID-142 CAID-170	2 2	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2405RG	1	TPMX 2405RG TPMX 2807RG	2 2
151.00-156.99	CAOD-170	1	CAID-142 CAID-170	2 2	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2807RG	1	TPMX 2405RG TPMX 2807RG	2 2
157.00-162.99	CAOD-170	1	CAID-142 CAID-170	1 3	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2807RG	1	TPMX 2405RG TPMX 2807RG	1 3
163.00-168.99	CAOD-170	1	CAID-170	4	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2807RG	1	TPMX 2807RG	4
169.00-188.99	CAOD-142	1	CAID-142	6	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2405RG	1	TPMX 2405RG	6
189.00-196.99	CAOD-142	1	CAID-142 CAID-170	5 1	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2405RG	1	TPMX 2405RG TPMX 2807RG	5 1
197.00-202.99	CAOD-142	1	CAID-142 CAID-170	4 2	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2405RG	1	TPMX 2405RG TPMX 2807RG	4 2
203.00-208.99	CAOD-142	1	CAID-142 CAID-170	3 3	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2405RG	1	TPMX 2405RG TPMX 2807RG	3 3
209.00-214.99	CAOD-170	1	CAID-142 CAID-170	3 3	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2807RG	1	TPMX 2405RG TPMX 2807RG	3 3
215.00-220.99	CAOD-170	1	CAID-142 CAID-170	2 4	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2807RG	1	TPMX 2405RG TPMX 2807RG	2 4
221.00-226.99	CAOD-170	1	CAID-142 CAID-170	1 5	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2807RG	1	TPMX 2405RG TPMX 2807RG	1 5

ISCARDEEPDRILL

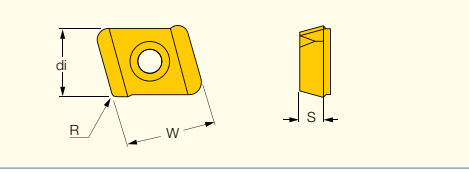
TPMX
Inserts for Drilling Heads DSD-EC / DDD-EC / DSD-IC / DSC-EC / DSC-IC



Designation	Dimensions di	S	R	Tough ↔ Hard IC9025	IC508	IC908	IC520
TPMX 1403R/LG	8.45	3.50	0.80	●	●	●	●
TPMX 1403R-DT	8.45	3.50	0.80			●	●
TPMX 1403RB	8.45	3.50	0.40	●		●	●
TPMX 1704R/LBG	10.30	4.00	0.80	●		●	●
TPMX 1704R/LG	10.30	4.00	0.80	●	●	●	●
TPMX 1704R-DT	10.30	4.00	0.80				●
TPMX 1704RBG	10.30	4.00	0.80			●	●
TPMX 2405R/LBG	14.20	5.50	1.20	●		●	●
TPMX 2405R/LG	14.20	5.50	1.20	●	●	●	●
TPMX 2405R-DT	14.20	5.50	1.20	●			●
TPMX 2405RBG	14.20	5.50	1.20	●		●	●
TPMX 2807R/LG	17.00	7.50	1.60	●	●	●	●
TPMX 2807R-DT	17.00	7.50	1.60			●	●
TPMX 2807RB	17.00	7.50	0.80	●		●	
TPMX 2807RBG	17.00	7.50	1.60			●	●

ISCARDEEPDRILL

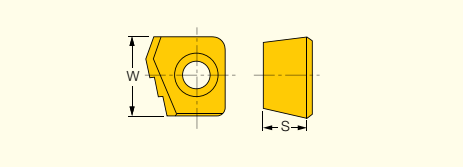
NPMX 0802 RG
Inserts for Drilling Heads
DSD-EC / DDD-EC / DSD-IC



Designation	Dimensions di	S	R	W	IC908
NPMX 0802RG	6.50	2.38	0.80	8.50	●

ISCARDEEPDRILL

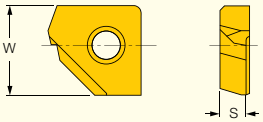
XPMT-UB
Inserts for Drilling Heads
DSD-EA / DSD-IA



Designation	Dimensions W	S	Tough ↔ Hard IC9025	IC908
XPMT 16002UB	9.50	2.80		●
XPMT 18003UB	11.00	3.05		●
XPMT 21003UB	13.00	3.55	●	●
XPMT 25003UB	14.50	3.40		●

ISCARDEEPDRILL

XPMT-45
Insert for Drilling Heads
DSC-EC / DSC-IC / DSC-EA

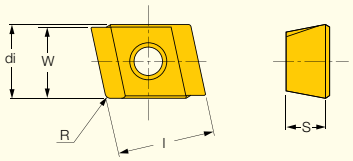


Designation	Dimensions W	Dimensions S	IC520M
XPMT 16002-45	9.50	2.80	●

For tools, see pages: DSC-IA (611)

ISCARDEEPDRILL

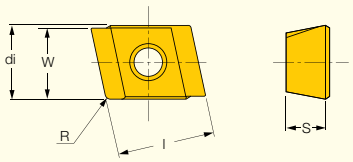
NPMT-R1
Inserts for Drilling Heads
DSD-EI / DDD-EA



Designation	Dimensions di	S	l	W	R	Tough ↔ Hard IC908	IC520
NPMT 05504R1	5.50	4.00	10.00	5.20	0.60	●	
NPMT 06504R1	6.50	4.00	10.00	6.20	0.80	●	
NPMT 07504R1	7.50	4.00	10.00	7.20	0.60		●
NPMT 09504R1	9.50	4.00	10.00	9.20	0.80	●	●

ISCARDEEPDRILL

NPMT-R1/2-DT
Inserts for Drilling Heads
DSD-EI / DDD-EI



Designation	Dimensions di	S	l	W	R	Tough ↔ Hard IC9025	IC908	IC520
NPGT 05504R1-DT	5.50	4.00	10.00	5.20	0.40		●	
NPMT 05504R1-DT	5.50	4.00	10.00	5.20	0.40	●		●
NPMT 06504R2-DT	6.50	4.00	10.00	6.20	0.40	●		
NPMT 07504R2-DT	7.50	4.00	10.00	7.20	0.40	●	●	●
NPMT 09504R2-DT	9.50	4.00	10.00	9.20	0.40	●		●

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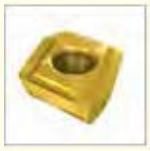
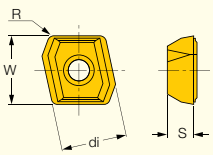
NPMX 0803 RB/RG
Inserts for Drilling Heads
DSD-EC / DDD-EC / DSD-IC





Designation	Dimensions di	S	R	W	Tough ↔ Hard IC9025	IC908	IC520
NPMX 0803RB	8.00	3.18	0.40	8.36	•	•	•
NPMX 0803RG	8.00	3.18	0.80	8.36	•	•	•

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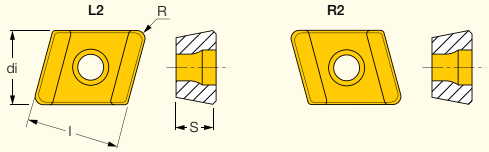
NPMT-L2/R2
Inserts for Drilling Heads
DSD-EF-FB / DDD-EF-FB

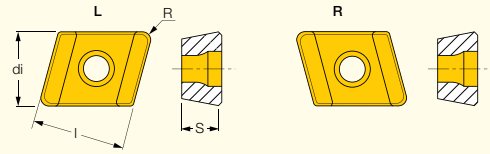


Designation	Dimensions di	R	S	l	Tough ↔ Hard IC9025	IC908	IC520
NPMT 05503R/L2	5.50	0.30	3.00	8.00		•	•
NPMT 06504R/L2	6.50	0.80	4.00	10.00	•	•	•
NPMT 0804R/L2	8.00	0.80	4.00	10.00	•	•	•
NPMT 09504R/L2	9.50	0.80	4.00	10.00	•	•	•
NPMT 12504R/L2	12.50	0.80	4.00	10.00	•	•	•

For tools, see pages: DDD-EF-FB (613) • DSD-EF-FB (605) • DSD-IF-FB (608)

ISCARDEEPDRILL

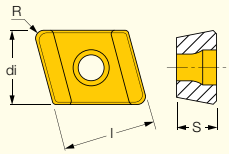
NPMT-L/R-DT
Inserts for Drilling Heads
DSD-EF-FB / DDD-EF-FB



Designation	Dimensions di	R	S	l	IC908
NPMT 06504LS-DT	6.50	0.40	4.00	10.00	•
NPMT 0804R-DT	8.00	0.40	4.00	10.00	•
NPMT 09504L2-DT	9.50	0.40	4.00	10.00	•
NPMT 09504R-DT	9.50	0.40	4.00	10.00	•
NPMT 12504LS-DT	12.50	0.40	4.00	10.00	•
NPMT 12504R-DT	12.50	0.40	4.00	10.00	•

FINEBEAM

NPHT-RG
Peripheral Precision Inserts for Drilling Heads DSD-EF-FB / DDD-EF-FB / DSD-IF-FB



Designation	Dimensions di	R	S	l	Tough ↔ Hard IC908	IC520
NPHT 06003RG	6.00	0.30	3.00	8.00	•	•
NPHT 07504RG	7.50	0.40	4.00	10.00	•	•
NPHT 09004RG	9.00	0.40	4.00	10.00	•	•
NPHT 11004RG	11.00	0.40	4.00	10.00	•	•
NPHT 13004RG	13.00	0.40	4.00	10.00	•	•

For tools, see pages: DDD-EF-FB (613) • DSD-EF-FB (605) • DSD-IF-FB (608)

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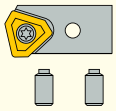
CAOD
Boring Head Peripheral Cartridge



Designation	Adjustment Screw	Key	Locking Screw	Key	Insert	Insert Clamping Screw
CAOD-080	SR 11201755-7	H1.5	SR 11201756-11	HW 2.0	NPMX 0803RG	SR 11201753-2
CAOD-0845	SR 11201755-6	H2.0	SR 11201756-10	HW 2.5	TPMX 1403RG	SR 11201753-3
CAOD-085	SR 11201755-6	H2.0	SR 11201756-10	HW 2.5	TPMX 1403RG	SR 11201753-3
CAOD-103	SR 11201755-8	H2.5	SR 11201756-12	HW 3.0	TPMX 1704RG	SR 11201753-7
CAOD-142	SR 11201755-9	H2.5	SR 11201756-15	HW 4.0	TPMX 2405RG	SR 11201753-9
CAOD-170	SR 11201755-11	H3.0	SR 11201756-15	HW 4.0	TPMX 2807RG	SR 11201753-10

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CAID
Boring Head Inner Cartridge

Designation	Key	Locking Screw	Key	Insert	Insert Clamping Screw
CAID-080	HW 1.5	SR 11201753-5	T-9/51	NPMX 0803RG	SR 11201753-2
CAID-0845	HW 2.0	SR 11201753-5	T-15/51	TPMX 1403RG	SR 11201753-3
CAID-085	HW 2.0	SR 11201753-5	T-15/51	TPMX 1403RG	SR 11201753-3
CAID-103	HW 2.5	SR 11201752-1	T-15/51	TPMX 1704RG	SR 11201753-7
CAID-142	HW 2.5	SR 11201756-7	HW 3.0	TPMX 2405RG	SR 11201753-9
CAID-170	HW 2.5	SR 11201756-7	HW 3.0	TPMX 2807RG	SR 11201753-10

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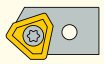
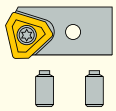
CAORC
Boring Head Central Cartridge



Designation	Adjustment Screw	Key	Locking Screw	Key	Insert	Insert Clamping Screw
CAORC-0845	SR 11201755-6	HW 2.0	SR 11201756-10	HW 2.5	TPMX 1403LG	SR 11201753-3
CAORC-103	SR 11201755-10	HW 2.5	SR 11201756-12	HW 3.0	TPMX 1704LG	SR 11201753-7
CAORC-142	SR 11201755-11	HW 2.5	SR 11201756-15	HW 4.0	TPMX 2405LG	SR 11201753-9

ISCARDEEPDRILL

CAOD Cartridges and Pads for Diameter Enlargement
Outer Cartridge Enlargement



Original Outer Cartridge	Cartridges for the Specified Enlargement Increments				
	+1 mm	+2 mm	+3 mm	+4 mm	+5 mm
CAOD-080	CAOD-080+1	CAOD-080+2			
CAOD-085	CAOD-085+1	CAOD-085+2	CAOD-085+3		
CAOD-103	CAOD-103+1	CAOD-103+2	CAOD-103+3	CAOD-103+4	
CAOD-142	CAOD-142+1	CAOD-142+2	CAOD-142+3	CAOD-142+4	CAOD-142+5
CAOD-170	CAOD-170+1	CAOD-170+2	CAOD-170+3	CAOD-170+4	CAOD-170+5

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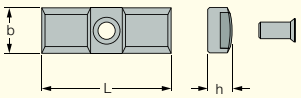
GP Cartridges and Pads for Diameter Enlargement
Enlargement Guide Pad

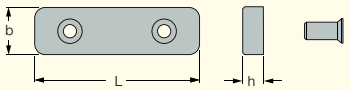


Guide Pad

Original Guide Pad	Guide Pads for the Specified Enlargement Increments				
	+1 mm	+2 mm	+3 mm	+4 mm	+5 mm
GPB-08	GPB-08+1	GPB-08+2	GPB-08+3		
GPB-10	GPB-10+1	GPB-10+2	GPB-10+3	GPB-10+4	
GPB-14	GPB-14+1	GPB-14+2	GPB-14+3	GPB-14+4	GPB-14+5
GPB-18	GPB-18+1	GPB-18+2	GPB-18+3	GPB-18+4	GPB-18+5

ISCARDEEPDRILL

RGP
Boring Head Enlargement Resin Pads

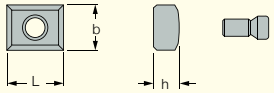


Designation	L	b	h	Lock Screw	Wrench
RGP01	40.00	10.0	4.0	SR 11201756-2	HW 2.0
RGP02	45.00	12.0	5.0	SR 11201756-3	HW 2.0
RGP03	50.00	15.0	5.8	SR 11201756-4	HW 2.5
RGP04	70.00	20.0	7.5	SR 11201756-5	HW 3.0
RGP05	80.00	30.0	12.5	SR 11201756-6	HW 4.0
RGP06	100.00	35.0	15.5	SR 11201756-6	HW 4.0

• Select an outer cartridge and pad for the required enlarged diameter.

ISCARDEEPDRILL

SGP
Boring Head Sub-Guide Pads

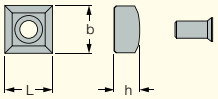


Designation	L	b	h	Clamping Screw	Key
SGP-01	10.00	6.0	3.0	SR 11201753-1	T-7/51
SGP-02	10.00	8.0	4.5	SR 11201753-4	T-9/51
SGP-03	10.00	10.0	5.0	SR 11201753-4	T-9/51
SGP-04	20.00	14.0	7.0	SR 11201752-2	T-15/51

• Select an outer cartridge and pad for the required enlarged diameter.

ISCARDEEPDRILL

GPP
Boring Head Guide Pad Protectors



Designation	L	b	h	Clamping Screw	Key
GPP-01	6.00	6.0	3.3	SR 11201753-1	T-7/51
GPP-02	6.00	6.0	3.8	SR 11201753-1	T-7/51
GPP-03	6.00	6.0	3.9	SR 11201753-1	T-7/51
GPP-04	8.00	8.0	4.4	SR 11201753-4	T-9/51
GPP-05	8.00	8.0	3.5	SR 11201753-4	T-9/51
GPP-06	8.00	8.0	4.5	SR 11201753-4	T-9/51
GPP-07	10.00	10.0	6.0	SR 11201753-8	T-15/51
GPP-08	14.00	14.0	7.5	SR 11201752-2	T-15/51
GPP-09	18.00	18.0	9.0	SR 11201756-15	HW 3.0

• Select an outer cartridge and pad for the required enlarged diameter.

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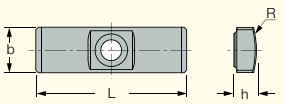
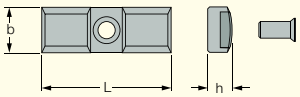
GPS
Deep Drilling Head Solid Carbide Guide Pads



Designation	Dimensions b	R	L	h	Tough ↔ Hard IC950	IC908
GPS-05-18-060	5.0	6.00	18.00	2.5		•
GPS-06-20-075	6.0	7.50	20.00	3.0	•	•
GPS-06-20-085	6.0	8.50	20.00	3.0	•	•
GPS-06-20-100	6.0	10.00	20.00	3.0	•	•
GPS-06-20-120	6.0	12.00	20.00	3.0	•	•
GPS-07-20-120	7.0	12.00	20.00	3.5	•	•
GPS-08-25-155	8.0	15.50	25.00	4.5	•	•
GPS-10-30-200	10.0	20.00	30.00	4.5	•	•
GPS-10-35-200	10.0	20.00	35.00	6.0	•	•
GPS-12-35-250	12.0	25.00	35.00	5.5	•	•
GPS-14-40-250	14.0	25.00	40.00	7.5		•
GPS-18-40-300	18.0	30.00	40.00	9.0		•

ISCARDEEPDRILL

GP/GPB
Deep Drilling Head Guide Pads



Designation	b	L	h	Clamping Screw	Key
GP-03CD	6.0	20.00	3.9	SR 11201753-1	T-7/51
GPB-06-20-075	6.0	20.00	3.0	SR 11201753-1	T-7/51
GPB-06-20-085	6.0	20.00	3.0	SR 11201753-1	T-7/51
GPB-06-20-100	6.0	20.00	3.0	SR 11201753-1	T-7/51
GPB-06-20-120	6.0	20.00	3.0	SR 11201753-1	T-7/51
GPB-07-20-120	7.0	20.00	3.5	SR 11201753-4	T-9/51
GP-04CD	8.0	20.00	4.4	SR 11201753-4	T-9/51
GPB-08-25-155	8.0	25.00	4.5	SR 11201753-4	T-9/51
GPB-10-30-200	10.0	30.00	4.5	SR 11201753-6	T-15/51
GPB-10-35-200	10.0	35.00	6.0	SR 11201753-8	T-15/51
GPB-12-35-250	12.0	35.00	5.5	SR 11201753-6	T-15/51
GPB-14-40-250	14.0	40.00	7.5	SR 11201752-2	T-15/51
GPB-18-40-300	18.0	40.00	9.0	SR 11201756-7S	HW 3.0

• Select an outer cartridge and pad for the required enlarged diameter. • Pads without grade identification are made from steel with brazed carbide tips.

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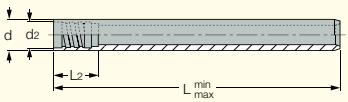
TS*
Drill Tubes - STS System - Inner Single Start Thread Connection



Designation	d Range	d	d_2	L_2	L min	L max
TS001 L=(0-1749)MM	8.00-8.99	7.10	6.00	16.00	0.0	1749.0
TS001 L=(1750-2600)MM	8.00-8.99	7.10	6.00	16.00	1750.0	2600.0
TS002 L=(0-1749)MM	9.00-9.99	8.30	7.20	16.00	0.0	1749.0
TS002 L=(1750-2600)MM	9.00-9.99	8.30	7.20	16.00	1750.0	2600.0
TS003 L=(0-1749)MM	10.00-10.99	9.00	7.60	16.00	0.0	1749.0
TS003 L=(1750-2600)MM	10.00-10.99	9.00	7.60	16.00	1750.0	2600.0
TS004 L=(0-1749)MM	11.00-11.99	10.00	8.60	16.00	0.0	1749.0
TS004 L=(1750-2600)MM	11.00-11.99	10.00	8.60	16.00	1750.0	2600.0
TS005 L=(0-1749)MM	12.00-13.49	11.00	9.10	16.00	0.0	1749.0
TS005 L=(1750-2600)MM	12.00-13.49	11.00	9.10	16.00	1750.0	2600.0
TS006 L=(0-1749)MM	13.50-14.79	12.00	10.80	16.00	0.0	1749.0
TS006 L=(1750-2600)MM	13.50-14.79	12.00	10.80	16.00	1750.0	2600.0

• **Indicate overall length (L) when ordering.** • **Ordering example:** TS004-L1500

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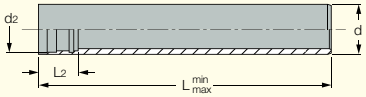
TS-I**
Drill Tubes - STS System - Inner
4 Start Thread Connection



Designation	d Range	d	d_2	L_2	L min	L max
TS-I01 L=(0-1749)MM	12.60-13.60	11.00	9.60	22.00	0.0	1749.0
TS-I01 L=(1750-2600)MM	12.60-13.60	11.00	9.60	22.00	1750.0	2600.0
TS-I02 L=(0-1749)MM	13.61-14.60	12.00	10.60	22.00	0.0	1749.0
TS-I02 L=(1750-2600)MM	13.61-14.60	12.00	10.60	22.00	1750.0	2600.0
TS-I03 L=(0-1749)MM	14.61-15.59	13.00	11.60	22.00	0.0	1749.0
TS-I03 L=(1750-2600)MM	14.61-15.59	13.00	11.60	22.00	1750.0	2600.0
TS-I0 L=(0-1749)MM	15.60-16.70	14.00	12.60	21.00	0.0	1749.0
TS-I0 L=(1750-2600)MM	15.60-16.70	14.00	12.60	21.00	1750.0	2600.0
TS-I1 L=(0-1749)MM	16.71-17.70	15.00	13.60	21.00	0.0	1749.0
TS-I1 L=(1750-2600)MM	16.71-17.70	15.00	13.60	21.00	1750.0	2600.0
TS-I2 L=(0-1749)MM	17.71-18.90	16.00	14.50	22.00	0.0	1749.0
TS-I2 L=(1750-2600)MM	17.71-18.90	16.00	14.50	22.00	1750.0	2600.0
TS-I3 L=(0-1749)MM	18.91-20.00	17.00	15.50	22.00	0.0	1749.0
TS-I3 L=(1750-2600)MM	18.91-20.00	17.00	15.50	22.00	1750.0	2600.0
TS-I4 L=(0-1749)MM	20.01-21.80	18.00	16.00	27.50	0.0	1749.0
TS-I4 L=(1750-2600)MM	20.01-21.80	18.00	16.00	27.50	1750.0	2600.0
TS-I5 L=(0-1749)MM	21.81-24.10	20.00	18.00	30.00	0.0	1749.0
TS-I5 L=(1750-2600)MM	21.81-24.10	20.00	18.00	30.00	1750.0	2600.0
TS-I6 L=(0-1749)MM	24.11-26.40	22.00	19.50	30.00	0.0	1749.0
TS-I6 L=(1750-2600)MM	24.11-26.40	22.00	19.50	30.00	1750.0	2600.0
TS-I7 L=(0-1749)MM	26.41-28.70	24.00	21.00	30.00	0.0	1749.0
TS-I7 L=(1750-2600)MM	26.41-28.70	24.00	21.00	30.00	1750.0	2600.0
TS-I8 L=(0-1749)MM	28.71-31.00	26.00	23.50	33.00	0.0	1749.0
TS-I8 L=(1750-2600)MM	28.71-31.00	26.00	23.50	33.00	1750.0	2600.0
TS-I9 L=(0-1749)MM	31.01-33.30	28.00	25.50	33.00	0.0	1749.0
TS-I9 L=(1750-2600)MM	31.01-33.30	28.00	25.50	33.00	1750.0	2600.0
TS-I10 L=(0-1749)MM	33.31-36.20	30.00	28.00	33.00	0.0	1749.0
TS-I10 L=(1750-2600)MM	33.31-36.20	30.00	28.00	33.00	1750.0	2600.0
TS-I11 L=(0-1749)MM	36.21-39.60	33.00	30.00	40.00	0.0	1749.0
TS-I11 L=(1750-2600)MM	36.21-39.60	33.00	30.00	40.00	1750.0	2600.0
TS-I12 L=(0-1749)MM	39.61-43.00	36.00	33.00	40.00	0.0	1749.0
TS-I12 L=(1750-2600)MM	39.61-43.00	36.00	33.00	40.00	1750.0	2600.0
TS-I13 L=(0-1749)MM	43.01-47.00	39.00	36.00	40.00	0.0	1749.0
TS-I13 L=(1750-2600)MM	43.01-47.00	39.00	36.00	40.00	1750.0	2600.0
TS-I14 L=(0-1749)MM	47.01-51.70	43.00	39.00	40.00	0.0	1749.0
TS-I14 L=(1750-2600)MM	47.01-51.70	43.00	39.00	40.00	1750.0	2600.0
TS-I15 L=(0-1749)MM	51.71-56.20	47.00	43.00	44.00	0.0	1749.0
TS-I15 L=(1750-2600)MM	51.71-56.20	47.00	43.00	44.00	1750.0	2600.0
TS-I16 L=(0-1749)MM	56.21-60.60	51.00	47.00	44.00	0.0	1749.0
TS-I16 L=(1750-2600)MM	56.21-60.60	51.00	47.00	44.00	1750.0	2600.0
TS-I17 L=(0-1749)MM	60.61-64.99	56.00	51.00	44.00	0.0	1749.0
TS-I17 L=(1750-2600)MM	60.61-64.99	56.00	51.00	44.00	1750.0	2600.0
TS-I18 L=(0-1749)MM	65.00-66.99	56.00	52.00	75.00	0.0	1749.0
TS-I18 L=(1750-2600)MM	65.00-66.99	56.00	52.00	75.00	1750.0	2600.0
TS-I19 L=(0-1749)MM	67.00-72.99	62.00	58.00	75.00	0.0	1749.0
TS-I19 L=(1750-2600)MM	67.00-72.99	62.00	58.00	75.00	1750.0	2600.0
TS-I20 L=(0-1749)MM	73.00-79.99	68.00	63.00	75.00	0.0	1749.0
TS-I20 L=(1750-2600)MM	73.00-79.99	68.00	63.00	75.00	1750.0	2600.0
TS-I21 L=(0-1749)MM	80.00-86.99	75.00	70.00	97.00	0.0	1749.0
TS-I21 L=(1750-2600)MM	80.00-86.99	75.00	70.00	97.00	1750.0	2600.0
TS-I22 L=(0-1749)MM	87.00-99.99	82.00	77.00	97.00	0.0	1749.0
TS-I22 L=(1750-2600)MM	87.00-99.99	82.00	77.00	97.00	1750.0	2600.0
TS-I23 L=(0-1749)MM	100.00-111.99	94.00	89.00	97.00	0.0	1749.0
TS-I23 L=(1750-2600)MM	100.00-111.99	94.00	89.00	97.00	1750.0	2600.0
TS-I24 L=(0-1749)MM	112.00-123.99	106.00	101.00	118.00	0.0	1749.0
TS-I24 L=(1750-2600)MM	112.00-123.99	106.00	101.00	118.00	1750.0	2600.0
TS-I25 L=(0-1749)MM	124.00-135.99	118.00	113.00	118.00	0.0	1749.0
TS-I25 L=(1750-2600)MM	124.00-135.99	118.00	113.00	118.00	1750.0	2600.0
TS-I26 L=(0-1749)MM	136.00-147.99	130.00	125.00	118.00	0.0	1749.0
TS-I26 L=(1750-2600)MM	136.00-147.99	130.00	125.00	118.00	1750.0	2600.0
TS-I27 L=(0-1749)MM	148.00-159.99	142.00	137.00	139.00	0.0	1749.0
TS-I27 L=(1750-2600)MM	148.00-159.99	142.00	137.00	139.00	1750.0	2600.0
TS-I28 L=(0-1749)MM	160.00-171.99	154.00	149.00	139.00	0.0	1749.0
TS-I28 L=(1750-2600)MM	160.00-171.99	154.00	149.00	139.00	1750.0	2600.0
TS-I29 L=(0-1749)MM	172.00-183.99	166.00	161.00	139.00	0.0	1749.0
TS-I29 L=(1750-2600)MM	172.00-183.99	166.00	161.00	139.00	1750.0	2600.0
TS-I30 L=(0-1749)MM	184.00-195.99	178.00	173.00	144.00	0.0	1749.0

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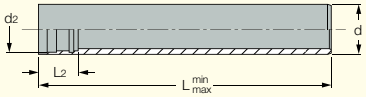
TS-I (continued)**
Drill Tubes - STS System - Inner
4 Start Thread Connection



Designation	d Range	d	d_2	L_2	L min	L max
TS-I30 L=(1750-2600)MM	184.00-195.99	178.00	173.00	144.00	1750.0	2600.0
TS-I31 L=(0-1749)MM	196.00-207.99	190.00	185.00	144.00	0.0	1749.0
TS-I31 L=(1750-2600)MM	196.00-207.99	190.00	185.00	144.00	1750.0	2600.0
TS-I32 L=(0-1749)MM	208.00-219.99	202.00	197.00	144.00	0.0	1749.0
TS-I32 L=(1750-2600)MM	208.00-219.99	202.00	197.00	144.00	1750.0	2600.0
TS-I33 L=(0-1749)MM	220.00-231.99	214.00	208.00	164.00	0.0	1749.0
TS-I33 L=(1750-2600)MM	220.00-231.99	214.00	208.00	164.00	1750.0	2600.0
TS-I34 L=(0-1749)MM	232.00-243.99	226.00	220.00	164.00	0.0	1749.0
TS-I34 L=(1750-2600)MM	232.00-243.99	226.00	220.00	164.00	1750.0	2600.0

• **Indicate overall length (L) when ordering.** • **Ordering example:** TS-I12-L2000
For tools, see pages: DSD-EF-FB (605) • DSD-EF-FT (604)

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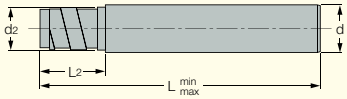
TS-O**
Drill Tubes - STS System - Outer
Single Start Thread Connection



Designation	d Range	d	d_2	L_2	L min	L max
TS-O0 L=(0-660)MM	14.50-15.00	12.00	11.50	23.00	0.0	660.0
TS-O0 L=(661-1100)MM	14.50-15.00	12.00	11.50	23.00	661.0	1100.0
TS-O1 L=(0-660)MM	15.01-15.50	12.00	11.80	23.00	0.0	660.0
TS-O1 L=(661-1100)MM	15.01-15.50	12.00	11.80	23.00	661.0	1100.0
TS-O2 L=(0-660)MM	15.51-16.00	13.00	12.40	23.00	0.0	660.0
TS-O2 L=(661-1100)MM	15.51-16.00	13.00	12.40	23.00	661.0	1100.0
TS-O3 L=(0-660)MM	16.01-16.50	13.00	12.70	23.00	0.0	660.0
TS-O3 L=(661-1100)MM	16.01-16.50	13.00	12.70	23.00	661.0	1100.0
TS-O4 L=(0-660)MM	16.51-17.25	14.00	13.40	23.00	0.0	660.0
TS-O4 L=(661-1100)MM	16.51-17.25	14.00	13.40	23.00	661.0	1100.0
TS-O5 L=(0-1749)MM	17.26-18.00	14.00	13.70	23.00	0.0	1749.0
TS-O5 L=(1750-2600)MM	17.26-18.00	14.00	13.70	23.00	1750.0	2600.0
TS-O6 L=(0-1749)MM	18.01-19.00	15.00	14.40	23.00	0.0	1749.0
TS-O6 L=(1750-2600)MM	18.01-19.00	15.00	14.40	23.00	1750.0	2600.0
TS-O7 L=(0-1749)MM	19.01-19.99	16.50	15.40	23.00	0.0	1749.0
TS-O7 L=(1750-2600)MM	19.01-19.99	16.50	15.40	23.00	1750.0	2600.0
TS-O8 L=(0-1749)MM	20.00-21.99	18.00	16.50	26.00	0.0	1749.0
TS-O8 L=(1750-2600)MM	20.00-21.99	18.00	16.50	26.00	1750.0	2600.0
TS-O9 L=(0-1749)MM	22.00-24.99	20.00	19.00	26.00	0.0	1749.0
TS-O9 L=(1750-2600)MM	22.00-24.99	20.00	19.00	26.00	1750.0	2600.0
TS-O10 L=(0-1749)MM	25.00-26.99	22.00	20.00	26.00	0.0	1749.0
TS-O10 L=(1750-2600)MM	25.00-26.99	22.00	20.00	26.00	1750.0	2600.0
TS-O11 L=(0-1749)MM	27.00-29.99	24.00	22.00	26.00	0.0	1749.0
TS-O11 L=(1750-2600)MM	27.00-29.99	24.00	22.00	26.00	1750.0	2600.0
TS-O12 L=(0-1749)MM	30.00-31.99	26.00	24.00	26.00	0.0	1749.0
TS-O12 L=(1750-2600)MM	30.00-31.99	26.00	24.00	26.00	1750.0	2600.0
TS-O13 L=(0-1749)MM	32.00-33.99	30.00	27.00	26.00	0.0	1749.0

• **Indicate overall length (L) when ordering.** • **Ordering example:** TS-036-L1100
For tools, see pages: DSD-IF-FB (608) • DSD-IF-FT (608).

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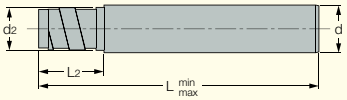
TS-O (continued)**
Drill Tubes - STS System - Outer
Single Start Thread Connection



Designation	d Range	d	d_2	L_2	L min	L max
TS-O13 L=(1750-2600)MM	32.00-33.99	30.00	27.00	26.00	1750.0	2600.0
TS-O14 L=(0-1749)MM	34.00-36.99	30.00	27.00	41.00	0.0	1749.0
TS-O14 L=(1750-2600)MM	34.00-36.99	30.00	27.00	41.00	1750.0	2600.0
TS-O15 L=(0-1749)MM	37.00-39.99	33.00	30.00	41.00	0.0	1749.0
TS-O15 L=(1750-2600)MM	37.00-39.99	33.00	30.00	41.00	1750.0	2600.0
TS-O16 L=(0-1749)MM	40.00-43.99	36.00	33.00	41.00	0.0	1749.0
TS-O16 L=(1750-2600)MM	40.00-43.99	36.00	33.00	41.00	1750.0	2600.0
TS-O17 L=(0-1749)MM	44.00-46.99	39.00	37.00	41.00	0.0	1749.0
TS-O17 L=(1750-2600)MM	44.00-46.99	39.00	37.00	41.00	1750.0	2600.0
TS-O18 L=(0-1749)MM	47.00-51.99	43.00	41.00	41.00	0.0	1749.0
TS-O18 L=(1750-2600)MM	47.00-51.99	43.00	41.00	41.00	1750.0	2600.0
TS-O19 L=(0-1749)MM	52.00-56.99	47.00	44.00	41.00	0.0	1749.0
TS-O19 L=(1750-2600)MM	52.00-56.99	47.00	44.00	41.00	1750.0	2600.0
TS-O20 L=(0-1749)MM	57.00-60.99	51.00	49.00	41.00	0.0	1749.0
TS-O20 L=(1750-2600)MM	57.00-60.99	51.00	49.00	41.00	1750.0	2600.0
TS-O21 L=(0-1749)MM	61.00-67.99	56.00	53.00	41.00	0.0	1749.0
TS-O21 L=(1750-2600)MM	61.00-67.99	56.00	53.00	41.00	1750.0	2600.0
TS-O22 L=(0-1749)MM	68.00-74.99	62.00	59.00	41.00	0.0	1749.0
TS-O22 L=(1750-2600)MM	68.00-74.99	62.00	59.00	41.00	1750.0	2600.0
TS-O23 L=(0-1749)MM	75.00-80.99	68.00	65.00	71.00	0.0	1749.0
TS-O23 L=(1750-2600)MM	75.00-80.99	68.00	65.00	71.00	1750.0	2600.0
TS-O24 L=(0-1749)MM	81.00-90.99	75.00	71.00	71.00	0.0	1749.0
TS-O24 L=(1750-2600)MM	81.00-90.99	75.00	71.00	71.00	1750.0	2600.0
TS-O25 L=(0-1749)MM	91.00-98.99	82.00	79.00	71.00	0.0	1749.0
TS-O25 L=(1750-2600)MM	91.00-98.99	82.00	79.00	71.00	1750.0	2600.0
TS-O26 L=(0-1749)MM	99.00-110.99	94.00	90.00	71.00	0.0	1749.0
TS-O26 L=(1750-2600)MM	99.00-110.99	94.00	90.00	71.00	1750.0	2600.0
TS-O27 L=(0-1749)MM	111.00-122.99	106.00	102.00	71.00	0.0	1749.0
TS-O27 L=(1750-2600)MM	111.00-122.99	106.00	102.00	71.00	1750.0	2600.0
TS-O28 L=(0-1749)MM	123.00-134.99	118.00	114.00	71.00	0.0	1749.0
TS-O28 L=(1750-2600)MM	123.00-134.99	118.00	114.00	71.00	1750.0	2600.0
TS-O29 L=(0-1749)MM	135.00-148.99	130.00	126.00	71.00	0.0	1749.0
TS-O29 L=(1750-2600)MM	135.00-148.99	130.00	126.00	71.00	1750.0	2600.0
TS-O30 L=(0-1749)MM	149.00-161.99	142.00	139.00	71.00	0.0	1749.0
TS-O30 L=(1750-2600)MM	149.00-161.99	142.00	139.00	71.00	1750.0	2600.0
TS-O31 L=(0-1749)MM	162.00-173.99	154.00	151.00	86.00	0.0	1749.0
TS-O31 L=(1750-2600)MM	162.00-173.99	154.00	151.00	86.00	1750.0	2600.0
TS-O32 L=(0-1749)MM	174.00-185.99	166.00	163.00	86.00	0.0	1749.0
TS-O32 L=(1750-2600)MM	174.00-185.99	166.00	163.00	86.00	1750.0	2600.0
TS-O33 L=(0-1749)MM	186.00-197.99	178.00	175.00	86.00	0.0	1749.0

• **Indicate overall length (L) when ordering.** • **Ordering example:** TS-036-L1100
For tools, see pages: DSD-IF-FB (608) • DSD-IF-FT (608).

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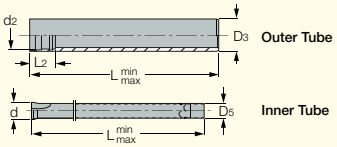
TDO-I (D18.41-65.00)
Double-Tube Drill System with 4 Start Thread Connection Outer Tubes



Designation	d Range	D_3	d_2	L_2	Int Tube	d	D_5	L min	L max
TDO-I0 L=(0-630)MM	18.41-20.00	18.00	16.00	27.50	TDI-N0	12.00	10.00	0.0	630.0
TDO-I0 L=(631-1070)MM	18.41-20.00	18.00	16.00	27.50	TDI-N0	12.00	10.00	631.0	1070.0
TDO-I1 L=(0-630)MM	20.01-21.80	19.50	18.00	30.00	TDI-N1	14.00	12.00	0.0	630.0
TDO-I1 L=(631-1070)MM	20.01-21.80	19.50	18.00	30.00	TDI-N1	14.00	12.00	631.0	1070.0
TDO-I2 L=(0-630)MM	21.81-24.10	21.50	19.50	30.00	TDI-N2	15.00	13.00	0.0	630.0
TDO-I2 L=(631-1070)MM	21.81-24.10	21.50	19.50	30.00	TDI-N2	15.00	13.00	631.0	1070.0
TDO-I3 L=(0-630)MM	24.11-26.40	23.50	21.00	30.00	TDI-N3	16.00	14.00	0.0	630.0
TDO-I3 L=(631-1070)MM	24.11-26.40	23.50	21.00	30.00	TDI-N3	16.00	14.00	631.0	1070.0
TDO-I4 L=(0-630)MM	26.41-28.70	26.00	23.50	33.00	TDI-N4	18.00	16.00	0.0	630.0
TDO-I4 L=(631-1070)MM	26.41-28.70	26.00	23.50	33.00	TDI-N4	18.00	16.00	631.0	1070.0
TDO-I5 L=(0-630)MM	28.71-31.00	28.00	25.50	33.00	TDI-N5	20.00	18.00	0.0	630.0
TDO-I5 L=(631-1070)MM	28.71-31.00	28.00	25.50	33.00	TDI-N5	20.00	18.00	631.0	1070.0
TDO-I6 L=(0-630)MM	31.01-33.30	30.50	28.00	33.00	TDI-N6	22.00	20.00	0.0	630.0
TDO-I6 L=(631-1070)MM	31.01-33.30	30.50	28.00	33.00	TDI-N6	22.00	20.00	631.0	1070.0
TDO-I7 L=(0-630)MM	33.31-36.20	33.00	30.00	40.00	TDI-N7	24.00	22.00	0.0	630.0
TDO-I7 L=(631-1070)MM	33.31-36.20	33.00	30.00	40.00	TDI-N7	24.00	22.00	631.0	1070.0
TDO-I8 L=(0-630)MM	36.21-39.60	35.50	33.00	40.00	TDI-N8	26.00	24.00	0.0	630.0
TDO-I8 L=(631-1070)MM	36.21-39.60	35.50	33.00	40.00	TDI-N8	26.00	24.00	631.0	1070.0
TDO-I9 L=(0-630)MM	39.61-43.00	39.00	36.00	40.00	TDI-N9	29.00	27.00	0.0	630.0
TDO-I9 L=(631-1070)MM	39.61-43.00	39.00	36.00	40.00	TDI-N9	29.00	27.00	631.0	1070.0
TDO-I10 L=(0-630)MM	43.01-47.00	42.50	39.00	40.00	TDI-N10	32.00	30.00	0.0	630.0
TDO-I10 L=(631-1070)MM	43.01-47.00	42.50	39.00	40.00	TDI-N10	32.00	30.00	631.0	1070.0
TDO-I11 L=(0-630)MM	47.01-51.70	46.50	43.00	44.00	TDI-N11	35.00	32.00	0.0	630.0
TDO-I11 L=(631-1070)MM	47.01-51.70	46.50	43.00	44.00	TDI-N11	35.00	32.00	631.0	1070.0
TDO-I12 L=(0-630)MM	51.71-56.20	51.00	47.00	44.00	TDI-N12	39.00	36.00	0.0	630.0
TDO-I12 L=(631-1070)MM	51.71-56.20	51.00	47.00	44.00	TDI-N12	39.00	36.00	631.0	1070.0
TDO-I13 L=(0-630)MM	56.21-65.00	55.50	51.00	44.00	TDI-N13	43.00	40.00	0.0	630.0
TDO-I13 L=(631-1070)MM	56.21-65.00	55.50	51.00	44.00	TDI-N13	43.00	40.00	631.0	1070.0

• **Please indicate overall length (L) when ordering** • **Ordering example:** TDO-I13-L1100 • For 18.41-65.00 diameter range, the inner tube should be 30 mm longer than the outer tube

For tools, see pages: DDD-EF-FB (613) • DDD-EF-FT (613)

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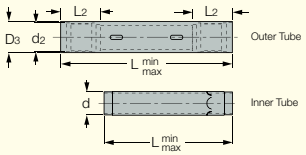
TDO-I (D65.00-171.99)
Double-Tube Drill System with 4 Start Thread Connection Outer Tubes

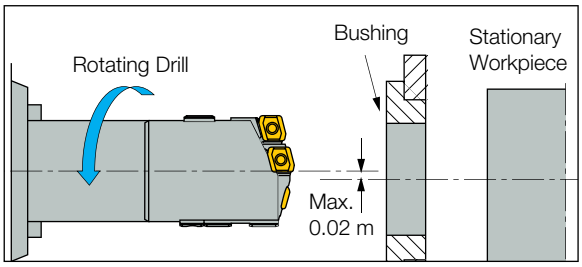


Designation	d Range	D_3	d_2	L_2	Int Tube	d	L min	L max
TDO-I14 L=(0-660)MM	65.00-66.99	56.00	52.00	75.00	TDI-N14	40.00	0.0	660.0
TDO-I14 L=(661-1100)MM	65.00-66.99	56.00	52.00	75.00	TDI-N14	40.00	661.0	1100.0
TDO-I15 L=(0-660)MM	67.00-72.99	62.00	58.00	75.00	TDI-N15	44.00	0.0	660.0
TDO-I15 L=(661-1100)MM	67.00-72.99	62.00	58.00	75.00	TDI-N15	44.00	661.0	1100.0
TDO-I16 L=(0-630)MM	73.00-79.99	68.00	63.00	75.00	TDI-N16	48.00	0.0	630.0
TDO-I16 L=(631-1070)MM	73.00-79.99	68.00	63.00	75.00	TDI-N16	48.00	631.0	1070.0
TDO-I17 L=(0-630)MM	80.00-86.99	75.00	70.00	97.00	TDI-N17	54.00	0.0	630.0
TDO-I17 L=(631-1070)MM	80.00-86.99	75.00	70.00	97.00	TDI-N17	54.00	631.0	1070.0
TDO-I18 L=(0-630)MM	87.00-99.99	82.00	77.00	97.00	TDI-N18	60.00	0.0	630.0
TDO-I18 L=(631-1070)MM	87.00-99.99	82.00	77.00	97.00	TDI-N18	60.00	631.0	1070.0
TDO-I19 L=(0-630)MM	100.00-111.99	94.00	89.00	97.00	TDI-N19	70.00	0.0	630.0
TDO-I19 L=(631-1070)MM	100.00-111.99	94.00	89.00	97.00	TDI-N19	70.00	631.0	1070.0
TDO-I20 L=(0-630)MM	112.00-123.99	106.00	101.00	118.00	TDI-N20	80.00	0.0	630.0
TDO-I20 L=(631-1070)MM	112.00-123.99	106.00	101.00	118.00	TDI-N20	80.00	631.0	1070.0
TDO-I21 L=(0-630)MM	124.00-135.99	118.00	113.00	118.00	TDI-N21	80.00	0.0	630.0
TDO-I21 L=(631-1070)MM	124.00-135.99	118.00	113.00	118.00	TDI-N21	80.00	631.0	1070.0
TDO-I22 L=(0-630)MM	136.00-147.99	130.00	125.00	118.00	TDI-N22	90.00	0.0	630.0
TDO-I22 L=(631-1070)MM	136.00-147.99	130.00	125.00	118.00	TDI-N22	90.00	631.0	1070.0
TDO-I23 L=(0-630)MM	148.00-159.99	142.00	137.00	139.00	TDI-N23	100.00	0.0	630.0
TDO-I23 L=(631-1070)MM	148.00-159.99	142.00	137.00	139.00	TDI-N23	100.00	631.0	1070.0
TDO-I24 L=(0-630)MM	160.00-171.99	154.00	149.00	139.00	TDI-N24	120.00	0.0	630.0
TDO-I24 L=(631-1070)MM	160.00-171.99	154.00	149.00	139.00	TDI-N24	120.00	631.0	1070.0

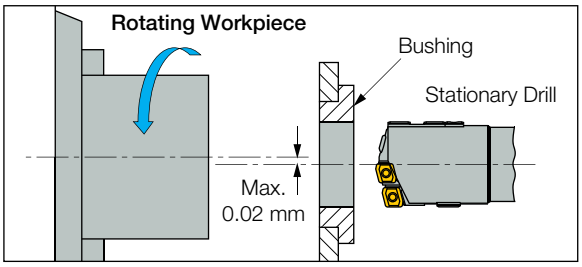
• **Indicate overall length (L) when ordering** • **Ordering example:** TDO-I18-L1150 • For 65.00-123.99 diameter range, the inner tube should be 190 mm longer than the outer tube. • For 124.00-183.99 diameter range, the inner tube should be 220 mm longer than the outer tube.

Drill Setup

Rotating Drill
- Can be applied on symmetrical and non-symmetrical workpieces
- Drill to bushing center misalignment should not exceed 0.02 mm

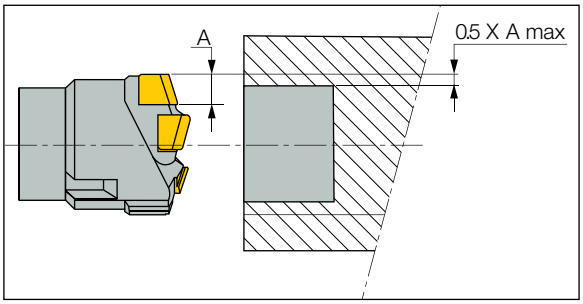


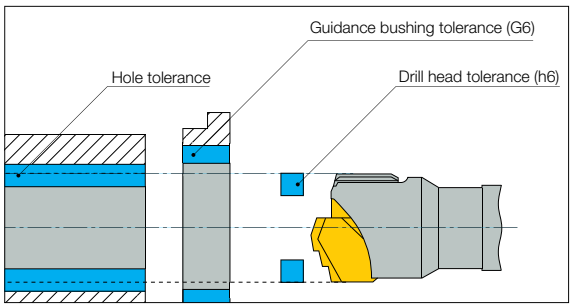
Stationary Drill
- Applied on symmetrical workpieces
- Improved hole straightness and bushing wear
- Drill to bushing center misalignment should not exceed 0.02 mm



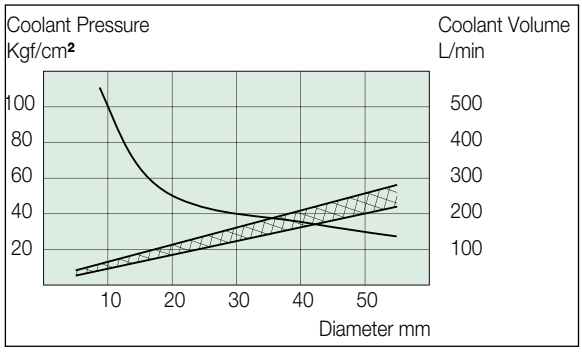
Drill Bushing and Workpiece Tolerance Relative Positioning

Pre-drilled Hole
A large pre-drilled hole (larger than D-a) ensures precise hole size and center location.

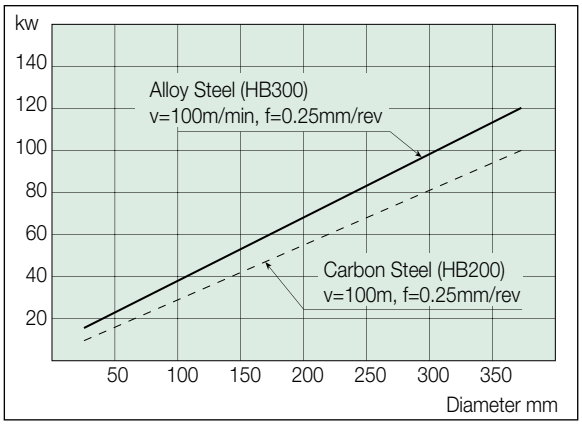




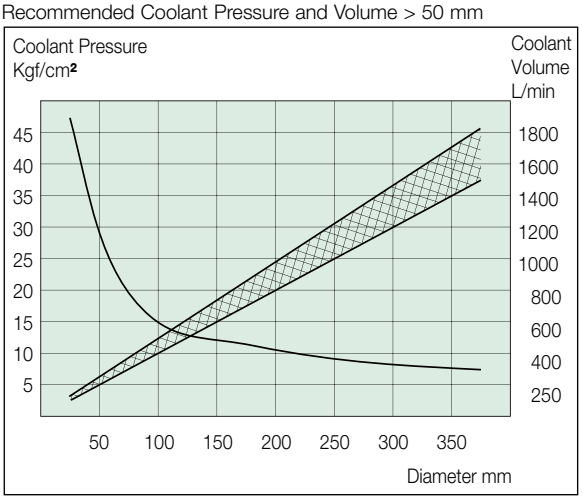
Recommended Coolant Pressure and Volume ≤ 50 mm



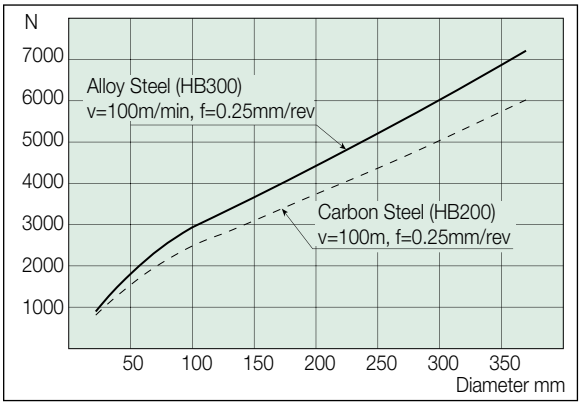
Machine Power



Recommended Coolant Pressure and Volume > 50 mm



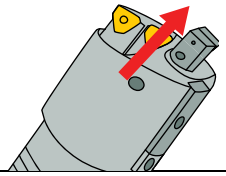
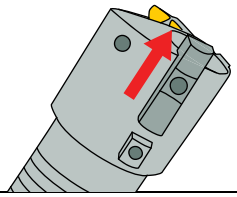
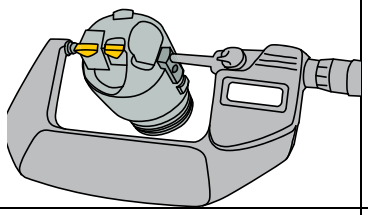
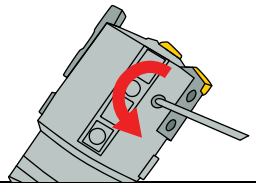
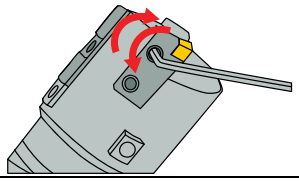
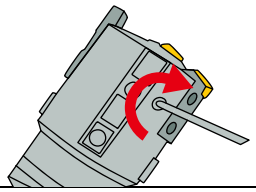
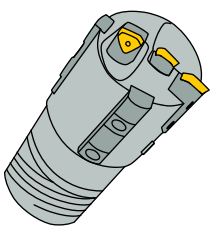
Machine Thrust Force



Technical Information - Cartridge Style Drill Head Diameter Setting

The drill head diameter is set and inspected with a master insert in our final inspection. However, the inserts in the market have a tolerance fluctuation so each time you index the insert, the diameter must be adjusted as per the following method.

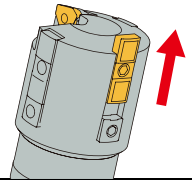
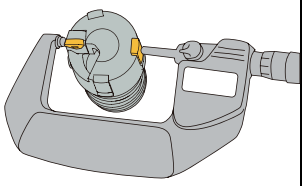
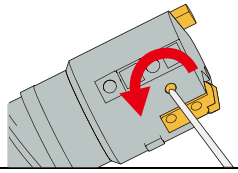
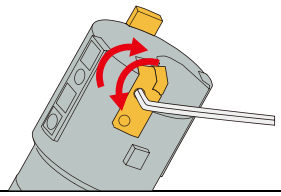
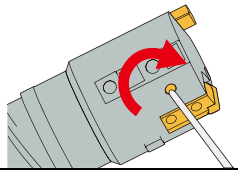
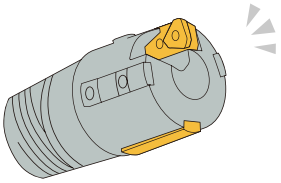
Note: When a corner change is made on the insert, it must be adjusted to the correct size or damage can be caused to the head body or workpiece material.

	1. Remove the inner cartridge to avoid interference with the guide screw.
	2. The dimensional guide pad must be slid forward to measure the diameter. 2.1 Loosen the lock screw and slide the guide pad forward. 2.2 Re-tighten the lock screw at the measuring position.
	3. Measure the diameter with a micrometer. We recommend setting the tool diameter at h8 tolerance to the cutting diameter. If the diameter is incorrect, go to step 4 below. If it's correct, go to step 5 below.
	4. Adjust the outer cartridge 4.1 First loosen the lock screw of the outer cartridge and then tighten it slightly.
	4.2 Proceed to adjust the diameter, using the 2 adjustment screws and measure with a micrometer.
	4.3 When set to the size, re-tighten the lock screw. 4.4 Recheck the diameter with a micrometer. If it is still out of tolerance, repeat the procedure from steps 1-4. Note: Please make sure to tighten the lock screw firmly before use. If loose, the cartridge may move and cause serious problems during machining.
	5. Slide the dimensional guide pad back to the original position and tighten the lock screw.
	6. Replace the inner cartridge and tighten the lock screw. Note: Please check that all lock screws are firmly tightened, as they may come loose if vibration occurs during drilling.

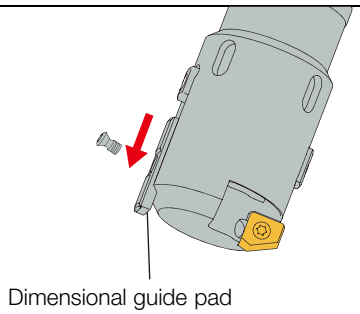
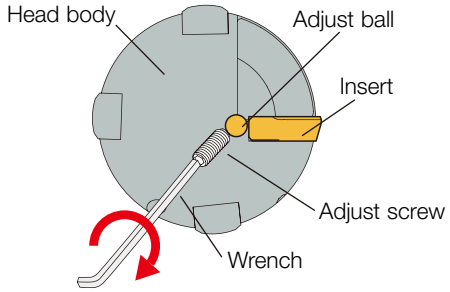
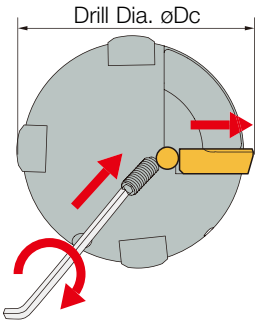
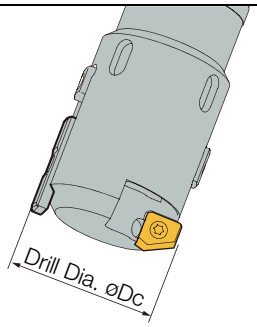
Diameter Setting

The drill head diameter is set and inspected with a master insert in our final inspection. However, the inserts in the market have a tolerance fluctuation so each time you change or index the insert, the diameter must be adjusted as per the following method.

Note: When a corner change is made on the insert, it must be adjusted to the correct size or damage can be caused to the head body or a work piece material.

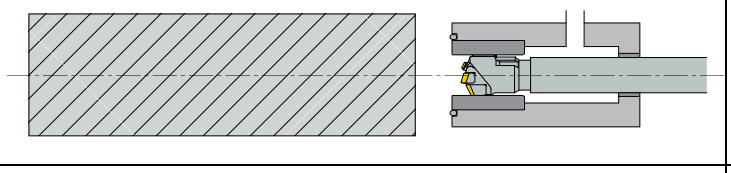
	1. The dimensional guide pad must be slid forward to measure the diameter. 1.1 Loosen the lock screw and slide the guide pad forward. 1.2 Retighten the lock screw at the measuring position.
	2. Measure the diameter with a micrometer. We recommend setting the tool diameter at h8 tolerance to the cutting diameter. Note: If the diameter is incorrect, go to **step 3.** If it's correct, go below **step 4**
	3. Adjust the outer cartridge 3.1 First loosen the lock screw of the outer cartridge and then tighten it slightly.
	3.2 Proceed to adjust the diameter, using the 2 adjustment screws and measure with a micrometer.
	3.3 When set to the size, re-tighten the lock screw. 3.4 Recheck the diameter with a micrometer. If it is still out of tolerance, repeat the procedure from step 3.1. Note: Please make sure to tighten the lock screw firmly before using. If loose, the cartridge may move and cause serious problems during machining.
	4. Slide the dimensional guide pad back to the original position and tighten the lock screw. Please check all the lock screws are firmly tightened as they may come loose if vibration occurs during drilling.

Drill diameter is adjusted with an adjust ball for diameter ø25 - ø39.99mm
with the following method.

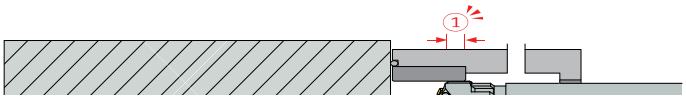
	1. Slide the dimensional guide pad forward and then retighten the lock screw at the measuring position.
	2. Tighten the adjust screw.
	3. As the adjust screw moves forward, insert moves peripheral direction.
	4. Measure the diameter with a micrometer. If the diameter is larger than expected, loosen the adjust screw and insert screw, then retighen the insert screw. Repeat the procedure from step 2

Technical Information - NC Cycle

Use the **NC** cycle as instructed below to optimize tool performance more safely.

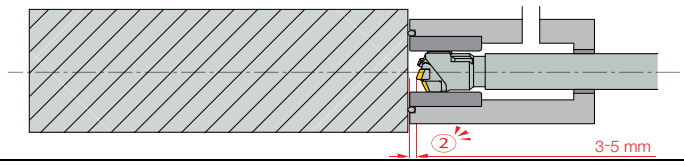


1. Start NC operation cycle.



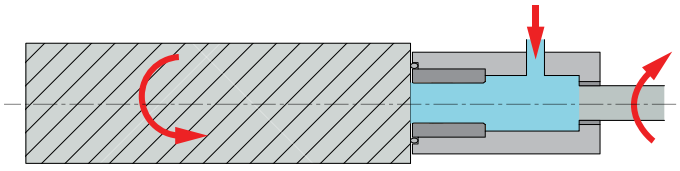
1

2. Oil pressure head moves until it touches the workpiece
Set the starting point of the main axis of the tool so that the guide pad remains inside the guide bush when the oil pressure head moves forward.

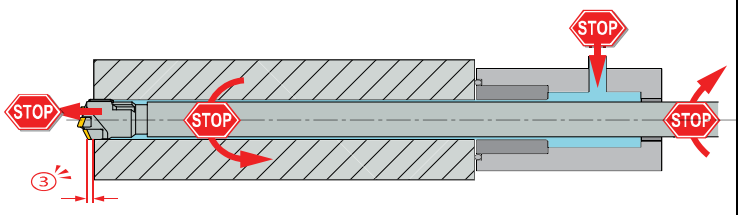


2

3. Move tool workpiece
Move the tool 3 to 5 mm from the edge of the workpiece.
If the available NC machine can support this approach, the operation process may start from this point



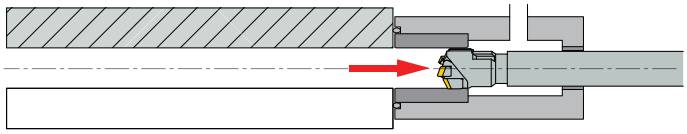
4. Start cutting
- Start coolant supply
- Start rotating (tool / workpiece / tool & workpiece)
- Start feeding



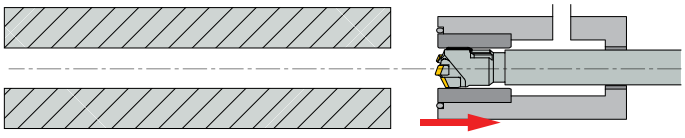
3

5. Stop cutting
- Stop feeding
- Stop rotating (tool / workpiece / tool & workpiece)
- Stop coolant supply

Stop rotation when the outer tip is at the edge of the workpiece.



6. Tool main axis back to starting point

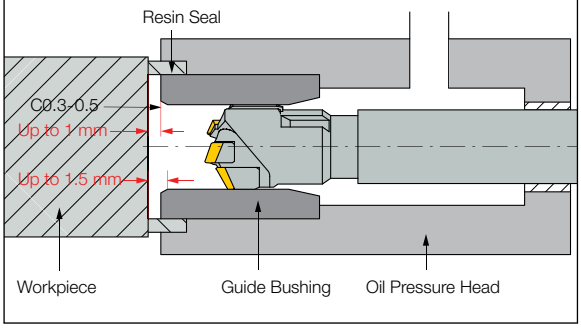


7. Oil pressure head back to starting point

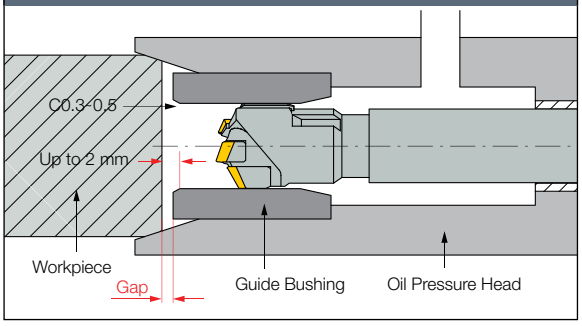
Technical Information - Notes for Guide Bushing Installation

Many of the problems in **BTA** drilling are caused by incorrect use of the guide bushing. The shape, type and tolerance greatly affect cutting accuracy and tool life. Please note the following when using one in your application.

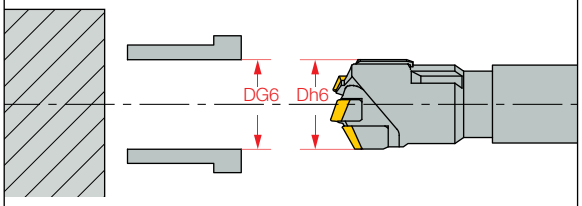
Resin Seal Type



Taper Cone Type

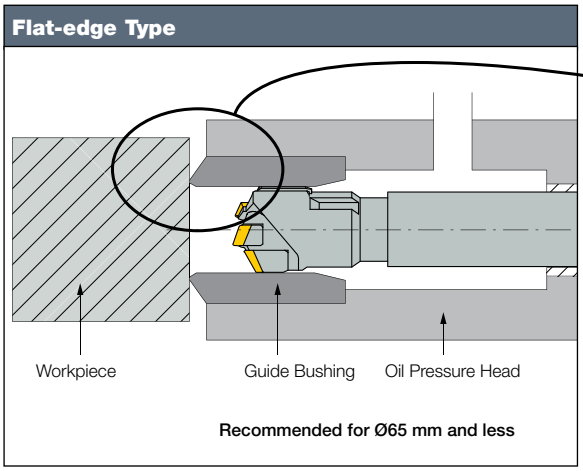


Guide Bushing Tolerance

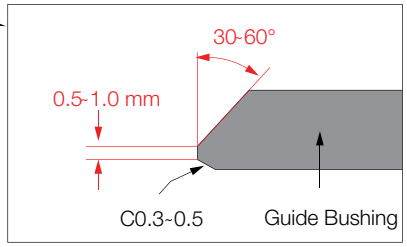


Tool Diameter D (mm)	G6 Tolerance (mm)
8.00 - 10.00	+0.005 ~ +0.014
10.01 - 18.00	+0.006 ~ +0.017
18.01 - 30.00	+0.007 ~ +0.020
30.01 - 50.00	+0.009 ~ +0.025
50.01 - 80.00	+0.010~ +0.029
80.01 - 120.00	+0.012 ~ +0.034
120.01 - 180.00	+0.014 ~ +0.039
180.01 - 245.99	+0.015 ~ +0.044

Flat-edge Type



Recommended for Ø65 mm and less



Technical Information - Cutting Fluid Management

Successful deep hole drilling can be achieved not only by tooling but also by an optimized combination of the tool, the machine and the cutting fluid. The cutting fluid is one of the essential components to obtain safe, stable and cost efficient deep hole drilling. Therefore, it is very important to choose and use the cutting fluid correctly.

Cutting Fluid

The cutting fluid plays a large role in lubrication of the tool, cooling of cutting edges and chips and evacuation of chips in deep hole drilling. It also contributes to improved tool life, surface finish and cutting accuracy when being fed continuously during cutting.

Lubrication

Lubrication of cutting edges and guide pads is necessary in deep hole drilling. To get efficient lubrication, it is recommended to use **EP** (Extreme Pressure) additives that contain sulfur or chlorine.

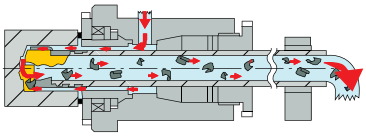
Heat dissipation

The coolability of cutting fluid depends on thermal characteristics such as thermal conductivity and specific heat. The cutting fluid of good coolability increases tool life, but a water-soluble type is not preferred in deep hole drilling because of a lesser lubrication effect. If water-soluble fluid is used, the concentration is recommended to be 10% (dilution rate 1/10) or more. Cooling of chips is important as well as cooling of cutting edges and guide pads in deep hole drilling. Temperature control is also important to maintain long tool life, stable cutting conditions and cutting accuracy.

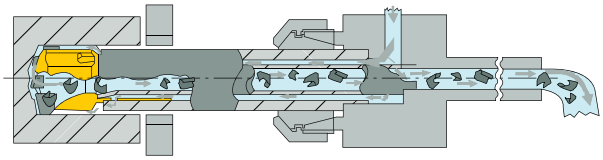
Chip evacuation

Cutting fluid has an important role in deep hole drilling as it evacuates chips through to the back end of boring bar (for **STS**) or inner tube (for **DTS**), whereas it finishes its role as soon as the chips are separated from the workpiece in general cutting. It is also important to control the flow and the pressure of cutting fluid.

STS (Single Tube System)



DTS (Double Tube System)



Coolant Unit

The coolant unit is also important to obtain the optimal effect of the cutting fluid, which has an important role in deep hole drilling.

Supply cutting fluid continuously at constant pressure and flow. Fluid pressure and flow are recommended to be continuously variable and monitored with a pressure gauge and a flow gauge. Screw pumps with an inverter are suitable.

Maintain constant temperature

The cutting fluid is heated by factors such as:

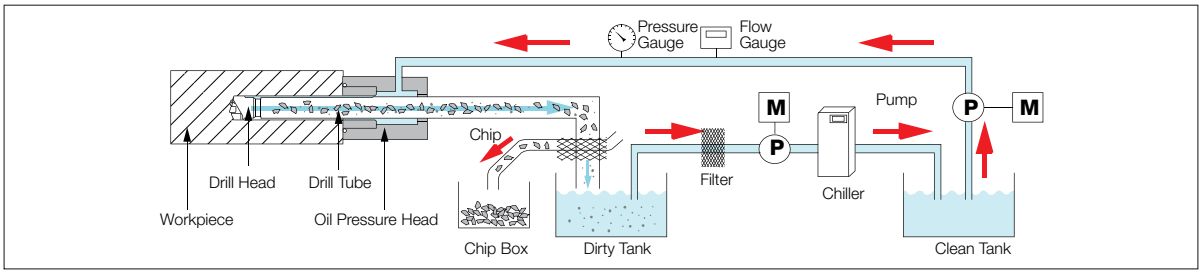
- Cutting edge
- Friction of guide pad
- Contact duration of heated chips and cutting fluid
- Pump

Maintenance of the constant cutting fluid temperature is important for stable cutting conditions, chip formation and cutting accuracy.
The temperature should be lower than 40°**C** (100°**F**) for **EP** additives to provide sufficient lubrication.
Therefore the cutting fluid temperature should be kept at 30-40°**C** (90-100°**F**) throughout the cutting operation.

Filtration

A lot of particles are contained in cutting fluid after finishing cutting and chip evacuation; thus filtration is necessary to remove them. The filter size should be selected to catch particles but not **EP** additives. The size depends on the cutting fluid, but generally it is suggested to be around 10-20 µm. For iron-based workpieces, a magnetic separator will be helpful, which decreases filter maintenance frequency.

Flow chart of cutting fluid in deep hole drilling



Deep Hole Drilling Systems

Problem	Possible Cause	Solution
The drill breaks or insert chips	Chip evacuation problems	Check that the coolant passages are clear and that the Venturi slots are not damaged
	Center misalignment of drill to workpiece	Check center alignment of drill to workpiece
		Check workpiece and drill clamping rigidity
Poor surface finish	Workpiece or drill clamping rigidity problem	Improve workpiece or drill clamping
	Inadequate coolant oil	Check the coolant oil and replace if necessary
	Cutting speed too low	Increase the cutting speed
Excessive leakage of the coolant	Chips block the fluid passages	Clear the chips
	The drill was incorrectly assembled, or the Venturi slots of the internal tube are located in the wrong direction	Check all connections and the direction of the internal tube
Insufficient coolant flow at the cutting zone, despite correct fluid supply	Chips block the fluid passages	Clear the chips
	Worn bushing or sealing device	Check the bushing and seal and replace if necessary
	Venturi slots are too wide (worn)	Replace the internal tube
	Internal tube shorter than the external tube	Replace the internal tube to one with a correct length
Chips jam in the front end of the drill	Insufficient coolant flow	Adjust the fluid flow by raising the pressure; check the filter and fluid quality

Connection Adapters
Various kinds of rotating and non-rotating drill connectors are available upon request.

Oil Pressure Heads
Oil pressure heads are available on request.

Special Heads
Special form heads for trepanning or any other special contours can be produced on request.

Recommended Machining Conditions

ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Material No. (1)
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1
		>= 0.25 %C	Annealed	650	190	2
		< 0.55 %C	Quenched and tempered	850	250	3
		>= 0.55 %C	Annealed	750	220	4
			Quenched and tempered	1000	300	5
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200	6
			Quenched and tempered	930	275	7
				1000	300	8
				1200	350	9
	High alloyed steel, cast steel, and tool steel		Annealed	680	200	10
			Quenched and tempered	1100	325	11
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12
			Martensitic	820	240	13
M	Stainless steel		Austenitic	600	180	14
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15
			Pearlitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum-wrought alloy		Not cureable		60	21
			Cured		100	22
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23
			Cured		90	24
		>12% Si	High temperature		130	25
	Copper alloys	>1% Pb	Free cutting		110	26
			Brass		90	27
			Electrolitic copper		100	28
	Non-metallic		Duroplastics, fiber plastics			29
			Hard rubber			30
S	High temp. alloys	Fe based	Annealed		200	31
			Cured		280	32
		Ni or Co based	Annealed		250	33
			Cured		350	34
			Cast		320	35
	Titanium Ti alloys			RM 400		36
			Alpha+beta alloys cured	RM 1050		37
H	Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Cast iron		Hardened		55 HRC	41

(1) For material groups see, G6-41

Ground Brazed Solid Drill Heads DSD-E0, DSD-E1, DSD-E3, DDD-E3, DSD-I1						Adjustable Solid Drill Heads DSD-IA, DSD-EA		
Dia. Range	8.00-20.00	15.60-20.00	20.01-31.00	31.01-43.00	43.01-65.00	Dia. Range	16.01-21.99	22.00-28.50
Vc (m/min)	Feed Rate f (mm/rev)					Vc (m/min)	Feed Rate f (mm/rev)	
70-120	0.05-0.13	0.08-0.15	0.1-0.17	0.13-0.2	0.16-0.3	60-120	0.08-0.13	0.1-0.15
70-120	0.05-0.13	0.08-0.15	0.1-0.17	0.13-0.2	0.16-0.3	60-120	0.08-0.13	0.1-0.15
40-70	0.05-0.13	0.08-0.15	0.1-0.17	0.13-0.2	0.16-0.3	60-120	0.08-0.13	0.1-0.15
70-120	0.05-0.13	0.08-0.15	0.1-0.17	0.13-0.2	0.16-0.3	60-120	0.08-0.13	0.1-0.15
55-100	0.05-0.1	0.08-0.12	0.1-0.15	0.13-0.17	0.15-0.28	50-100	0.08-0.11	0.1-0.13
70-100	0.05-0.13	0.08-0.15	0.1-0.17	0.13-0.2	0.16-0.3	50-100	0.08-0.11	0.1-0.15
55-100	0.05-0.1	0.08-0.12	0.1-0.15	0.13-0.17	0.15-0.28	50-100	0.08-0.11	0.1-0.13
55-100	0.05-0.1	0.08-0.12	0.1-0.15	0.13-0.17	0.15-0.28	50-100	0.08-0.11	0.1-0.13
55-100	0.05-0.1	0.08-0.12	0.1-0.15	0.13-0.17	0.15-0.28	50-100	0.08-0.11	0.1-0.13
50-85	0.05-0.13	0.08-0.15	0.1-0.17	0.13-0.2	0.16-0.3	60-120	0.08-0.13	0.1-0.15
55-100	0.05-0.1	0.08-0.12	0.1-0.15	0.13-0.17	0.15-0.28	50-100	0.08-0.11	0.1-0.13
60-100	0.05-0.13	0.08-0.15	0.1-0.28	0.13-0.3	0.16-0.35	40-80	0.08-0.13	0.1-0.15
60-100	0.05-0.13	0.08-0.15	0.1-0.28	0.13-0.3	0.16-0.35	40-80	0.08-0.13	0.1-0.15
60-100	0.05-0.12	0.05-0.12	0.08-0.25	0.1-0.28	0.15-0.33	30-60	0.05-0.11	0.08-0.14
80-100	0.05-0.13	0.08-0.15	0.1-0.17	0.13-0.2	0.16-0.3	70-100	0.08-0.13	0.1-0.15
80-100	0.05-0.13	0.08-0.15	0.1-0.17	0.13-0.2	0.16-0.3	70-100	0.08-0.13	0.1-0.15
60-100	0.05-0.13	0.06-0.13	0.08-0.18	0.1-0.2	0.15-0.25	50-90	0.06-0.12	0.08-0.16
60-100	0.05-0.13	0.06-0.13	0.08-0.18	0.1-0.2	0.15-0.25	50-80	0.06-0.12	0.08-0.16
50-100	0.05-0.13	0.06-0.13	0.08-0.18	0.1-0.2	0.15-0.25	50-90	0.06-0.12	0.08-0.16
50-100	0.05-0.13	0.06-0.13	0.08-0.18	0.1-0.2	0.15-0.25	50-90	0.06-0.12	0.08-0.16
65-130	0.05-0.13	0.08-0.15	0.1-0.2	0.15-0.25	0.16-0.3	60-120	0.08-0.13	0.1-0.18
65-100	0.05-0.13	0.08-0.15	0.1-0.2	0.15-0.25	0.16-0.3	60-90	0.08-0.13	0.1-0.18
65-130	0.05-0.13	0.08-0.15	0.1-0.2	0.15-0.25	0.16-0.3	60-120	0.08-0.13	0.1-0.18
65-130	0.05-0.13	0.08-0.15	0.1-0.2	0.15-0.25	0.16-0.3	60-120	0.08-0.13	0.1-0.18
65-130	0.05-0.13	0.08-0.15	0.1-0.2	0.15-0.25	0.16-0.3	60-120	0.08-0.13	0.1-0.18
65-130	0.05-0.13	0.08-0.15	0.1-0.2	0.15-0.25	0.16-0.3	60-120	0.08-0.13	0.1-0.18
65-130	0.05-0.13	0.08-0.15	0.1-0.2	0.15-0.25	0.16-0.3	60-120	0.08-0.13	0.1-0.18
65-130	0.05-0.13	0.08-0.15	0.1-0.2	0.15-0.25	0.16-0.3	60-120	0.08-0.13	0.1-0.18
10-50	0.05-0.12	0.06-0.12	0.08-0.15	0.12-0.18	0.15-0.25	20-50	0.06-0.11	0.08-0.14
10-50	0.05-0.12	0.06-0.12	0.08-0.15	0.12-0.18	0.15-0.25	20-50	0.06-0.11	0.08-0.14
10-50	0.05-0.12	0.06-0.12	0.08-0.15	0.12-0.18	0.15-0.25	20-50	0.06-0.11	0.08-0.14
10-50	0.05-0.12	0.06-0.12	0.08-0.15	0.12-0.18	0.15-0.25	20-50	0.06-0.11	0.08-0.14
10-50	0.05-0.12	0.06-0.12	0.08-0.15	0.12-0.18	0.15-0.25	20-50	0.06-0.11	0.08-0.14
30-50	0.05-0.1	0.05-0.1	0.08-0.12	0.1-0.15	0.12-02	20-50	0.05-0.09	0.08-0.11
30-50	0.05-0.1	0.05-0.1	0.08-0.12	0.1-0.15	0.12-0.2	20-50	0.05-0.09	0.08-0.11

Recommended Machining Conditions

ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Material No. (1)
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1
		>= 0.25 %C	Annealed	650	190	2
		< 0.55 %C	Quenched and tempered	850	250	3
		>= 0.55 %C	Annealed	750	220	4
			Quenched and tempered	1000	300	5
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200	6
			Quenched and tempered	930	275	7
				1000	300	8
				1200	350	9
	High alloyed steel, cast steel, and tool steel		Annealed	680	200	10
			Quenched and tempered	1100	325	11
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12
			Martensitic	820	240	13
M	Stainless steel		Austenitic	600	180	14
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15
			Pearlitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum-wrought alloy		Not cureable		60	21
			Cured		100	22
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23
			Cured		90	24
		>12% Si	High temperature		130	25
	Copper alloys	>1% Pb	Free cutting		110	26
			Brass		90	27
			Electrolitic copper		100	28
	Non-metallic		Duroplastics, fiber plastics			29
			Hard rubber			30
S	High temp. alloys	Fe based	Annealed		200	31
			Cured		280	32
		Ni or Co based	Annealed		250	33
			Cured		350	34
			Cast		320	35
	Titanium Ti alloys			RM 400		36
			Alpha+beta alloys cured	RM 1050		37
H	Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Cast iron		Hardened		55 HRC	41

Adjustable Counterboring Heads DSD-EF-FB, DDD-EF-FB, DSD-IF-FB (Width of Cut, mm)			Adjustable Solid Drill Heads DSD-EC, DDD-EC, DSD-IC					
Dia. Range	25.00 - 43.00	43.01 - 65.00	Dia. Range	38.00-39.99	40.00-51.99	52.00-63.99	64.00-84.99	85.00-
Vc (m/min)	Feed Rate f (mm/rev)		Vc (m/min)	Feed Rate f (mm/rev)				
70-130	0.1-0.3	0.12-0.35	60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
70-130	0.1-0.3	0.12-0.35	60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
70-130	0.1-0.3	0.12-0.35	60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
70-130	0.1-0.3	0.12-0.35	60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
70-130	0.1-0.3	0.12-0.35	60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
70-120	0.1-0.3	0.12-0.35	60-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-120	0.1-0.3	0.12-0.35	60-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-120	0.1-0.3	0.12-0.35	50-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-120	0.1-0.3	0.12-0.35	50-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
70-130	0.1-0.3	0.12-0.35	60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
70-130	0.1-0.3	0.12-0.35	60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
70-130	0.1-0.3	0.12-0.35	60-110	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
70-130	0.1-0.3	0.12-0.35	60-110	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
70-130	0.1-0.3	0.12-0.35	60-110	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
50-110	0.1-0.25	0.12-0.35	60-100	0.08-0.13	0.1-0.15	0.13-0.18	0.15-0.2	0.18-0.23
50-110	0.1-0.25	0.12-0.35	60-100	0.08-0.13	0.1-0.15	0.13-0.18	0.15-0.2	0.18-0.23
60-110	0.1-0.25	0.12-0.35	60-100	0.08-0.13	0.1-0.15	0.13-0.18	0.15-0.2	0.18-0.23
60-110	0.1-0.25	0.12-0.35	60-100	0.08-0.13	0.1-0.15	0.13-0.18	0.15-0.2	0.18-0.23
70-110	0.1-0.25	0.12-0.35	60-100	0.08-0.13	0.1-0.15	0.13-0.18	0.15-0.2	0.18-0.23
70-110	0.1-0.25	0.12-0.35	60-100	0.08-0.13	0.1-0.15	0.13-0.18	0.15-0.2	0.18-0.23
65-130	0.1-0.25	0.12-0.35	60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
65-130	0.08-0.23	0.12-0.27	60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
65-130	0.08-0.23	0.12-0.27	60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
65-130	0.08-0.23	0.12-0.27	60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
65-130	0.08-0.23	0.12-0.27	60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
65-130	0.08-0.23	0.12-0.27	60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
65-130	0.08-0.23	0.12-0.27	60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
65-130	0.08-0.23	0.12-0.27	60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
20-50	0.08-0.23	0.12-0.27	20-65	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
20-50	0.08-0.23	0.12-0.27	20-65	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
20-50	0.08-0.23	0.12-0.27	20-65	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
20-50	0.08-0.23	0.12-0.27	20-65	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
20-50	0.08-0.23	0.12-0.27	20-65	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
30-60	0.08-0.23	0.12-0.27	30-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
30-60	0.08-0.23	0.12-0.27	30-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3

Recommended Machining Conditions

ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Material No. (1)
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1
		>= 0.25 %C	Annealed	650	190	2
		< 0.55 %C	Quenched and tempered	850	250	3
		>= 0.55 %C	Annealed	750	220	4
			Quenched and tempered	1000	300	5
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200	6
			Quenched and tempered	930	275	7
				1000	300	8
				1200	350	9
	High alloyed steel, cast steel, and tool steel		Annealed	680	200	10
			Quenched and tempered	1100	325	11
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12
			Martensitic	820	240	13
M	Stainless steel		Austenitic	600	180	14
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15
			Pearlitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum-wrought alloy		Not cureable		60	21
			Cured		100	22
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23
			Cured		90	24
		>12% Si	High temperature		130	25
	Copper alloys	>1% Pb	Free cutting		110	26
			Brass		90	27
			Electrolitic copper		100	28
	Non-metallic		Duroplastics, fiber plastics			29
			Hard rubber			30
S	High temp. alloys	Fe based	Annealed		200	31
			Cured		280	32
		Ni or Co based	Annealed		250	33
			Cured		350	34
			Cast		320	35
	Titanium Ti alloys			RM 400		36
			Alpha+beta alloys cured	RM 1050		37
H	Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Cast iron		Hardened		55 HRC	41

Adjustable Counterboring Heads DSC-EA, DSC-EC, DSC-I1, DST-I1, DSC-IA, DSC-IC, DDC-E1, DDT-E1 (Width of Cut, mm)				Trepanning Heads		Ground Brazed Counterboring Heads DSC-E1, DST-E1, DSC-I1, DST-I1, DDC-E1 (Width of Cut, mm)		
Dia. Range	1-3	3-8	8-23	Dia. Range	120-400	Dia. Range	1-3	3-5
Vc (m/min)	Feed Rate f (mm/rev)			Vc (m/min)	Feed Rate f (mm/rev)	Vc (m/min)	Feed Rate f (mm/rev)	
60-140	0.1-0.3	0.15-0.3	0.1-0.3	80-100	0.12-0.3	60-140	0.1-0.3	0.15-0.3
60-120	0.1-0.3	0.15-0.3	0.1-0.3	80-100	0.12-0.3	60-120	0.1-0.3	0.15-0.3
60-120	0.1-0.3	0.15-0.3	0.1-0.3	80-100	0.12-0.3	60-120	0.1-0.3	0.15-0.3
50-100	0.1-0.3	0.15-0.3	0.1-0.3	80-100	0.12-0.3	50-100	0.1-0.3	0.15-0.3
50-100	0.1-0.3	0.15-0.3	0.1-0.3	80-100	0.12-0.3	50-100	0.1-0.3	0.15-0.3
60-130	0.1-0.3	0.15-0.3	0.1-0.3	70-100	0.12-0.3	60-130	0.1-0.3	0.15-0.3
60-120	0.1-0.3	0.15-0.3	0.1-0.3	70-100	0.12-0.3	60-120	0.1-0.3	0.15-0.3
60-100	0.1-0.3	0.15-0.3	0.1-0.3	60-100	0.12-0.3	60-100	0.1-0.3	0.15-0.3
60-100	0.1-0.3	0.15-0.3	0.1-0.3	60-100	0.12-0.3	60-100	0.1-0.3	0.15-0.3
50-100	0.1-0.3	0.15-0.3	0.1-0.3	70-100	0.12-0.3	50-100	0.1-0.3	0.15-0.3
60-100	0.1-0.3	0.15-0.3	0.1-0.3	60-100	0.12-0.3	60-100	0.1-0.3	0.15-0.3
60-100	0.1-0.3	0.15-0.3	0.1-0.3	50-90	0.12-0.3	60-100	0.1-0.3	0.15-0.3
60-100	0.1-0.3	0.15-0.3	0.1-0.3	50-90	0.12-0.3	60-100	0.1-0.3	0.15-0.3
60-100	0.1-0.3	0.15-0.3	0.1-0.3	50-90	0.12-0.3	60-100	0.1-0.3	0.15-0.3
60-120	0.1-0.3	0.15-0.3	0.1-0.3	80-100	0.12-0.3	60-120	0.1-0.3	0.15-0.3
50-120	0.1-0.3	0.15-0.3	0.1-0.3	60-100	0.12-0.3	50-120	0.1-0.3	0.15-0.3
60-120	0.1-0.3	0.15-0.3	0.1-0.3	50-100	0.12-0.3	60-120	0.1-0.3	0.15-0.3
60-120	0.1-0.3	0.15-0.3	0.1-0.3	50-100	0.12-0.3	60-120	0.1-0.3	0.15-0.3
60-120	0.1-0.3	0.15-0.3	0.1-0.3	80-100	0.12-0.3	60-120	0.1-0.3	0.15-0.3
60-120	0.1-0.3	0.15-0.3	0.1-0.3	80-100	0.12-0.3	60-120	0.1-0.3	0.15-0.3
70-200	0.1-0.4	0.15-0.3	0.1-0.3	65-130	0.1-0.3	70-200	0.1-0.4	0.15-0.3
60-200	0.1-0.4	0.1-0.4	0.1-0.4	65-130	0.1-0.3	60-200	0.1-0.4	0.1-0.4
60-200	0.1-0.4	0.1-0.4	0.1-0.4	65-130	0.1-0.3	60-200	0.1-0.4	0.1-0.4
60-200	0.1-0.4	0.1-0.4	0.1-0.4	65-130	0.1-0.3	60-200	0.1-0.4	0.1-0.4
60-200	0.1-0.4	0.1-0.4	0.1-0.4	65-130	0.1-0.3	60-200	0.1-0.4	0.1-0.4
60-200	0.1-0.4	0.1-0.4	0.1-0.4	65-130	0.1-0.3	60-200	0.1-0.4	0.1-0.4
60-200	0.1-0.4	0.1-0.4	0.1-0.4	65-130	0.1-0.3	60-200	0.1-0.4	0.1-0.4
60-200	0.1-0.4	0.1-0.4	0.1-0.4	65-130	0.1-0.3	60-200	0.1-0.4	0.1-0.4
40-80	0.1-0.3	0.15-0.3	0.1-0.3	20-65	0.1-0.2	40-80	0.1-0.3	0.15-0.3
40-80	0.1-0.3	0.15-0.3	0.1-0.3	20-65	0.1-0.2	40-80	0.1-0.3	0.15-0.3
40-80	0.1-0.3	0.15-0.3	0.1-0.3	20-65	0.1-0.2	40-80	0.1-0.3	0.15-0.3
40-80	0.1-0.3	0.15-0.3	0.1-0.3	20-65	0.1-0.2	40-80	0.1-0.3	0.15-0.3
40-80	0.1-0.3	0.15-0.3	0.1-0.3	20-65	0.1-0.2	40-80	0.1-0.3	0.15-0.3
60-100	0.1-0.3	0.15-0.3	0.1-0.3	30-100	0.1-0.2	60-100	0.1-0.3	0.15-0.3
60-100	0.1-0.3	0.15-0.3	0.1-0.3	30-100	0.1-0.2	60-100	0.1-0.3	0.15-0.3

ISO	Material		Condition	Tensile Strength [N/mm2]	Hardness HB
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125
		>= 0.25 %C	Annealed	650	190
		< 0.55 %C	Quenched and tempered	850	250
		>= 0.55 %C	Annealed	750	220
			Quenched and tempered	1000	300
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200
			Quenched and tempered	930	275
				1000	300
				1200	350
	High alloyed steel, cast steel, and tool steel		Annealed	680	200
			Quenched and tempered	1100	325
	Stainless steel		Ferritic/martensitic	680	200
			Martensitic	820	240
M	Stainless steel		Austenitic	600	180
K	Grey cast iron (GG)		Ferritic/pearlitic		180
			Pearlitic		260
	Nodular cast iron (GGG)		Ferritic		160
			Pearlitic		250
	Malleable cast iron		Ferritic		130
			Pearlitic		230
N	Aluminum-wrought alloy		Not cureable		60
			Cured		100
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75
			Cured		90
		>12% Si	High temperature		130
	Copper alloys	>1% Pb	Free cutting		110
			Brass		90
			Electrolitic copper		100
	Non-metallic		Duroplastics, fiber plastics		
			Hard rubber		
S	High temp. alloys	Fe based	Annealed		200
			Cured		280
		Ni or Co based	Annealed		250
			Cured		350
			Cast		320
	Titanium Ti alloys			RM 400	
			Alpha+beta alloys cured	RM 1050	

Machining Recommendations for TRIDEEP Drills

Material No.	TRIDEEP BTA Drilling Heads	
	Cutting Speed (m/min)	Feed Rate (mm/rev)
		Drill Dia. Dc (mm) 16.00-28.00
1	90-130	0.15-0.20
2	90-130	0.15-0.20
3	90-130	0.15-0.20
4	70-130	0.10-0.25
5	70-130	0.10-0.25
6	70-120	0.10-0.25
7	60-120	0.10-0.25
8	60-120	0.10-0.25
9	60-120	0.10-0.25
10	70-130	0.10-0.25
11	70-130	0.10-0.25
12	80-130	0.06-0.10
13	80-130	0.06-0.10
14	80-130	0.06-0.10
15	50-110	0.10-0.20
16	50-110	0.10-0.20
17	60-110	0.10-0.20
18	60-110	0.10-0.20
19	70-110	0.10-0.20
20	70-110	0.10-0.20
21	65-130	0.10-0.20
22	65-130	0.08-0.18
23	65-130	0.08-0.18
24	65-130	0.08-0.18
25	65-130	0.08-0.18
26	65-130	0.08-0.18
27	65-130	0.08-0.18
28	65-130	0.08-0.18
29	65-130	0.08-0.18
30	65-130	0.08-0.18
31	20-50	0.08-0.18
32	20-50	0.08-0.18
33	20-50	0.08-0.18
34	20-50	0.08-0.18
35	20-50	0.08-0.18
36	30-60	0.08-0.18
37	30-60	0.08-0.18

Requested Information Form for Deep Hole Drill Design

Company name _____ **Telephone no.** _____

Address _____ **Date** _____

Contact person _____ **Customer no.** _____

WORKPIECE

Product name: _____ Hole diameter: _____

Hole depth: _____ No. of holes: _____ Tolerance (of hole): _____

Surface finish (Rz, Ra...): _____ Deviation (mm/100): _____ Straightness (mm/100): _____

MATERIAL

Material (**DIN, AISI, JIS**...): _____

Hardness (**HB, HS, HRC**...): _____

Condition: ☐ Annealed ☐ Quenched ☐ Tempered ☐ Cast

☐ Other _____

MACHINE

Machine supplier name: _____

Machine type/model: ☐ **NC** lathe ☐ Machining center ☐ Other _____

Rigidity: ☐ Good ☐ Normal ☐ Poor

Spindle power (kW): _____

Tool and/or workpiece rotation (**TR**/**WR**):

☐ Tool and workpiece ☐ Rotating workpiece (**WR**) ☐ Rotating tool (**TR**)

TYPE OF COOLANT

Water based: ☐ Soluble ☐ Emulsion _____ %

Oil based: ☐ Coolant Pressure (bar): _____ Coolant Volume (L/min): _____

TOOL
Drill Head

Drill diameter: _____ (mm/inch)

Thread: ☐ Inner ☐ Outer Brazed: ☐

Indexable: ☐ Adjustable ☐ Direct mount Coating: ☐ Coated ☐ Uncoated

Solid drilling: ☐ Counterboring: ☐

Pre-drilled hole size: _____ (mm/inch)

Bottom finishing: ☐ Full ball R ☐ Flat bottom R ☐ Corner R ☐ Other _____

Trepanning: ☐ Y ☐ N

Tube outer diameter: _____ (mm/inch) Core size diameter: _____ (mm/inch)

Please fill in and return to your **ISCAR** representative.

Requested Information Form for Deep Hole Drill Design (continued)

TUBE

Outside diameter: _____ (mm/inch) Total Length: _____ (mm/inch)

Internal Thread: _____

External Thread: 4 ☐ Starts 2 ☐ Starts 1 ☐ Starts

Tube Thread: 1 ☐ End ☐ Both ends

Inner Tube Length: _____ (mm/inch)

Inner Tube Slit: 1 ☐ End ☐ Both ends

Drilling System & Boring Conditions

Single Tube System: ☐ Blind Hole Drilling: ☐ Double Tube System: ☐

Cross Hole Drilling: ☐ Through Hole Drilling: ☐

Please sketch your drilling application

GENERAL PRODUCTION INFORMATION

Quantity of parts per year: _____

Grade, tool life, etc.: _____

Perfomance expectation: Vc= ____ mm/min **N=** ____ **RPM** **F=** _____ mm/min f= ____ mm/rev

Cutting data: _____

Description of present system in use: _____

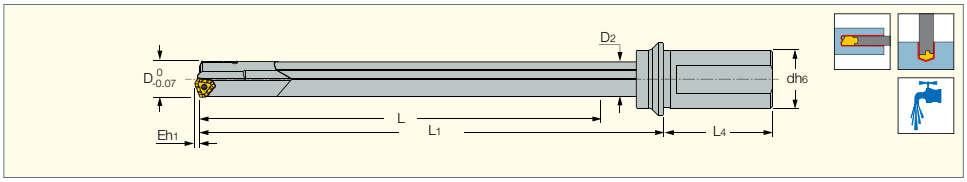
Please fill in and return to your **ISCAR** representative.

GUNDRILLS

TRIDEEP

GD-DH

Gundrills Carrying Triangular Inserts with 3 Chip Splitting Cutting Edges and a Wiper for High Hole Surface Quality



Designation	D	L	d	D_2	L_1	E_{h1}	L_4	Insert
GD-DH 14.00-15D-M25-07	14.00	225.0	25.00	13.50	261.0	1.95	56.0	TOGT 07..
GD-DH 14.00-20D-M25-07	14.00	300.0	25.00	13.50	336.0	1.95	56.0	TOGT 07..
GD-DH 14.00-25D-M25-07	14.00	375.0	25.00	13.50	411.0	1.95	56.0	TOGT 07..
GD-DH 14.50-15D-M25-07	14.50	225.0	25.00	14.00	262.0	1.95	56.0	TOGT 07..
GD-DH 14.50-20D-M25-07	14.50	300.0	25.00	14.00	337.0	1.95	56.0	TOGT 07..
GD-DH 14.50-25D-M25-07	14.50	375.0	25.00	14.00	412.0	1.95	56.0	TOGT 07..
GD-DH 15.00-15D-M25-07	15.00	240.0	25.00	14.50	278.0	1.95	56.0	TOGT 07..
GD-DH 15.00-20D-M25-07	15.00	320.0	25.00	14.50	358.0	1.95	56.0	TOGT 07..
GD-DH 15.00-25D-M25-07	15.00	400.0	25.00	14.50	438.0	1.95	56.0	TOGT 07..
GD-DH 16.00-10D-M25-08	16.00	170.0	25.00	15.50	209.0	2.20	56.0	TOGT 08..
GD-DH 16.00-15D-M25-08	16.00	255.0	25.00	15.50	294.0	2.20	56.0	TOGT 08..
GD-DH 16.00-25D-M25-08	16.00	425.0	25.00	15.50	464.0	2.20	56.0	TOGT 08..
GD-DH 16.50-10D-M25-08	16.50	170.0	25.00	15.50	209.0	2.20	56.0	TOGT 08..
GD-DH 16.50-15D-M25-08	16.50	255.0	25.00	15.50	294.0	2.20	56.0	TOGT 08..
GD-DH 16.50-25D-M25-08	16.50	425.0	25.00	15.50	464.0	2.20	56.0	TOGT 08..
GD-DH 17.00-10D-M25-08	17.00	180.0	25.00	16.20	220.0	2.20	56.0	TOGT 08..
GD-DH 17.00-15D-M25-08	17.00	270.0	25.00	16.20	310.0	2.20	56.0	TOGT 08..
GD-DH 17.00-25D-M25-08	17.00	450.0	25.00	16.20	490.0	2.20	56.0	TOGT 08..
GD-DH 17.50-25D-M25-08	17.50	450.0	25.00	16.20	490.0	2.20	56.0	TOGT 08..
GD-DH 18.00-10D-M25-08	18.00	190.0	25.00	16.20	232.0	3.00	56.0	TOGT 08..
GD-DH 18.00-15D-M25-08	18.00	285.0	25.00	17.20	327.0	3.00	56.0	TOGT 08..
GD-DH 18.00-25D-M25-08	18.00	475.0	25.00	17.20	517.0	3.00	56.0	TOGT 08..
GD-DH 18.50-15D-M25-09	18.50	285.0	25.00	17.20	327.0	3.00	56.0	TOGT 09..
GD-DH 18.50-25D-M25-09	18.50	475.0	25.00	17.20	517.0	3.00	56.0	TOGT 09..
GD-DH 19.00-10D-M25-09	19.00	200.0	25.00	18.20	243.0	3.00	56.0	TOGT 09..
GD-DH 19.00-15D-M25-09	19.00	300.0	25.00	18.20	343.0	3.00	56.0	TOGT 09..
GD-DH 19.00-25D-M25-09	19.00	500.0	25.00	18.20	543.0	3.00	56.0	TOGT 09..
GD-DH 19.50-15D-M25-09	19.50	300.0	25.00	18.20	343.0	3.00	56.0	TOGT 09..
GD-DH 19.50-25D-M25-09	19.50	500.0	25.00	18.20	543.0	3.00	56.0	TOGT 09..
GD-DH 20.00-10D-M32-09	20.00	210.0	32.00	19.00	255.0	3.20	60.0	TOGT 09..
GD-DH 20.00-15D-M32-09	20.00	315.0	32.00	19.00	360.0	3.20	60.0	TOGT 09..
GD-DH 20.00-25D-M32-09	20.00	525.0	32.00	19.00	570.0	3.20	60.0	TOGT 09..
GD-DH 21.00-10D-M32-10	21.00	220.0	32.00	20.00	266.0	3.20	60.0	TOGT 10..
GD-DH 21.00-15D-M32-10	21.00	330.0	32.00	20.00	376.0	3.20	60.0	TOGT 10..
GD-DH 21.00-25D-M32-10	21.00	550.0	32.00	20.00	596.0	3.20	60.0	TOGT 10..
GD-DH 22.00-10D-M32-11	22.00	230.0	32.00	21.00	278.0	3.40	60.0	TOGT 11..
GD-DH 22.00-15D-M32-11	22.00	345.0	32.00	21.00	393.0	3.40	60.0	TOGT 11..
GD-DH 22.00-25D-M32-11	22.00	575.0	32.00	21.00	623.0	3.40	60.0	TOGT 11..
GD-DH 23.00-10D-M32-11	23.00	240.0	32.00	22.00	289.0	3.40	60.0	TOGT 11..
GD-DH 23.00-15D-M32-11	23.00	360.0	32.00	22.00	409.0	3.40	60.0	TOGT 11..
GD-DH 23.00-25D-M32-11	23.00	600.0	32.00	22.00	649.0	3.40	60.0	TOGT 11..
GD-DH 24.00-10D-M32-11	24.00	250.0	32.00	23.00	301.0	3.40	60.0	TOGT 11..
GD-DH 24.00-15D-M32-11	24.00	375.0	32.00	23.00	426.0	3.40	60.0	TOGT 11..
GD-DH 24.00-25D-M32-11	24.00	625.0	32.00	23.00	676.0	3.40	60.0	TOGT 11..
GD-DH 25.00-10D-M32-11	25.00	260.0	32.00	24.00	312.0	3.60	60.0	TOGT 11..
GD-DH 25.00-15D-M32-11	25.00	390.0	32.00	24.00	442.0	3.60	60.0	TOGT 11..
GD-DH 25.00-25D-M32-11	25.00	650.0	32.00	24.00	702.0	3.60	60.0	TOGT 11..
GD-DH 26.00-10D-M40-12	26.00	270.0	40.00	25.00	324.0	3.60	70.0	TOGT 12..
GD-DH 26.00-15D-M40-12	26.00	405.0	40.00	25.00	459.0	3.60	70.0	TOGT 12..
GD-DH 26.00-25D-M40-12	26.00	675.0	40.00	25.00	729.0	3.60	70.0	TOGT 12..
GD-DH 27.00-10D-M40-12	27.00	280.0	40.00	26.00	335.0	3.60	70.0	TOGT 12..
GD-DH 27.00-15D-M40-12	27.00	420.0	40.00	26.00	475.0	3.60	70.0	TOGT 12..
GD-DH 27.00-25D-M40-12	27.00	700.0	40.00	26.00	755.0	3.60	70.0	TOGT 12..
GD-DH 28.00-10D-M40-12	28.00	280.0	40.00	27.00	337.0	3.60	70.0	TOGT 12..
GD-DH 28.00-15D-M40-12	28.00	420.0	40.00	27.00	477.0	3.60	70.0	TOGT 12..
GD-DH 28.00-25D-M40-12	28.00	700.0	40.00	27.00	757.0	3.60	70.0	TOGT 12..

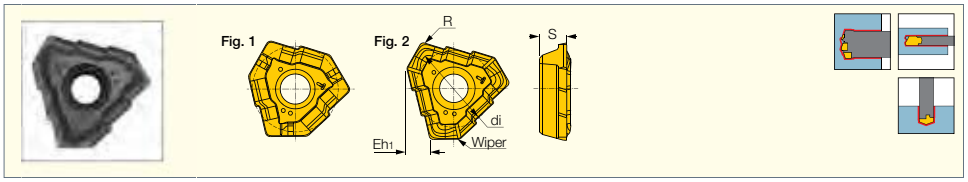
• Note: Gundrills can be supplied with up to 2400 mm length on request. • Inserts and guide pads should be ordered separately. • For user guide and cutting conditions, see page 650. **For inserts, see pages:** TOGT (650)

Spare Parts

Diameter Range	Insert	Insert Clamping Screw	Key	Solid Carbide Guide Pad	Guide Pad Clamping Screw	Key
14.00-15.99	TOGT 070304-DT	SR-14-560/S	T-8	GPS-05-18-060	SR34-508	T-7
16.00-18.00	TOGT 080305-DT	SR-14-560/S	T-8	GPS-06-20-075		
18.01-20.00	TOGT 090305-DT	SR-14-560/S	T-8	GPS-06-20-085		
20.01-20.99	TOGT 100305-DT	SR-34-506	T-8	GPS-06-20-085		
21.00-21.99	TOGT 100305-DT			GPS-06-20-100		
22.00-25.00	TOGT 110405-DT	SR-14-571/S	T-15	GPS-06-20-100		
25.01-28.00	TOGT 120405-DT	SR-14-506	T-15	GPS-06-20-120		

TRIDEEP

TOGT
Deep Drilling Inserts with 3 Chip Splitting Cutting Edges, Positive Rake Chipbreaker and a Wiper

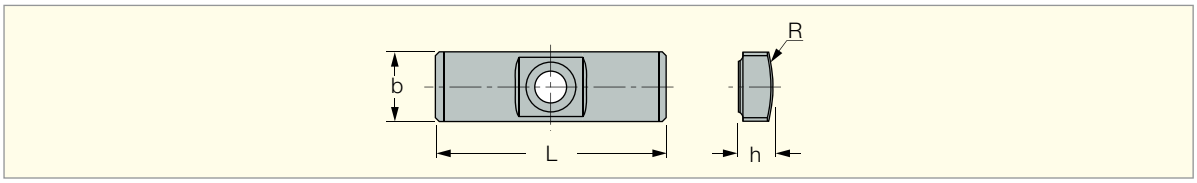


Designation	Dimensions di	R	Eh1	S	Fig.	IC908
TOGT 070304-DT	7.69	0.40	1.95	2.30	1	●
TOGT 080305-DT	8.55	0.50	2.20	2.80	1	●
TOGT 090305-DT	8.32	0.50	3.00	3.00	2	●
TOGT 100305-DT	9.23	0.50	3.20	3.30	2	●
TOGT 110405-DT	10.40	0.50	3.40	3.80	2	●
TOGT 120405-DT	11.59	0.50	3.60	4.30	2	●

For tools, see pages: DDD-EF-FT (613) • DSD-EF-FT (604) • DSD-IF-FT (608) • GD-DH (649)

TRIDEEP

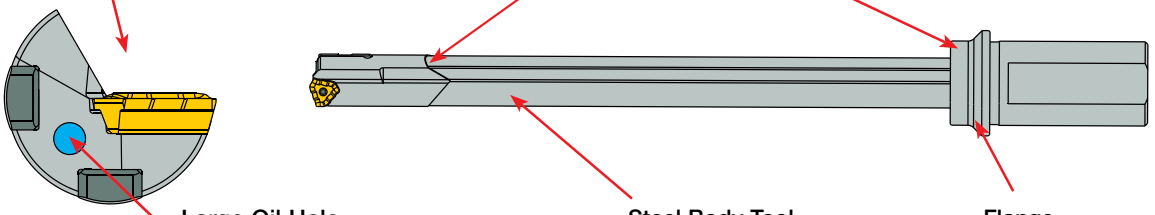
USER GUIDE



Following is a table of all the available pads with their new designations, the tools they are used on and priority recommendations for use:

	Tool Diameter Min	Max	Dimensions (mm) b	L	R	h	Solid Carbide Description	1st option IC908	2nd option IC950	3rd option (brazed) Description
TRIDEEP	14.00	15.99	5	18	6	2.5	GPS-05-18-060	●		
	16.00	18.00	6	20	7.5	3	GPS-06-20-075	●	●	GPB-06-20-075 CDZAP
	18.01	21.00	6	20	8.5	3	GPS-06-20-085	●	●	GPB-06-20-085 CDZAP
	21.01	25.00	6	20	10	3	GPS-06-20-100	●	●	GPB-06-20-100 CDZAP
	25.01	28.00	6	20	12	3	GPS-06-20-120	●	●	GPB-06-20-120 CDZAP

Wide Flute Angle
- Smooth chip evacuation



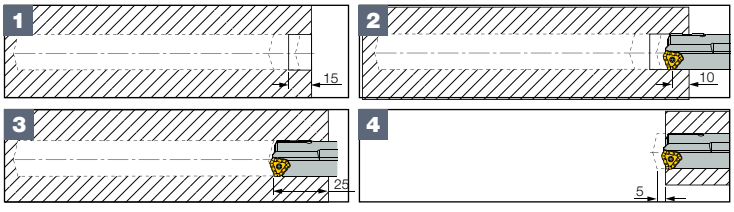
Large Oil Hole
- Efficient lubrication
- Longer life of inserts and guide pads

Steel Body Tool
- Extremely high rigidity
- Simple direct mounting setup

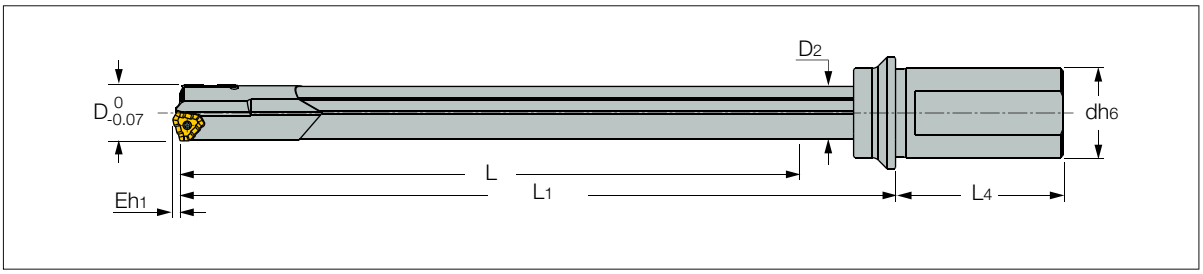
Flange
- Superior rigidity for higher speeds and feeds

Drilling Process on Machining Centers and Lathe Machines

1. Drill a 15 mm pilot hole D $^{+0.05}_{+0.03}$ flat bottom
2. Set the **TRIDEEP** drill into the pilot hole (10 mm depth).Vc=5-10 m/min f=0.5-1.0 mm/rev
3. Initial cutting at a 25 mm **DOC** (80% feed rate), verify activated coolant (Vc=100%).
4. In case of through hole, drill the full hole to a depth of +5 mm
5. Retract with slow rotation (5-10 m/min)



Inquiry Form



1. Tool
Quantity.....
Nominal diameter and tolerance .....
Please fill in dimensions on the sketch below.

Driver
Driver: for standard drivers please use codes from page 654 .....
☐ Code No.
☐ Special, please attach sketch and specifications.

2. Workpiece
(If possible, attach a drawing)
2.1 Material
Material description (**DIN** material number or any other standard):
.....
Hardness and Properties:
.....

2.2 Hole Type
☐ Blind Hole ☐ Drilling into Pre-hole
☐ Angled Entry
☐ Drilling into Solid ☐ Boring ☐ Angled Exit
Drilling Depth mm Hole Tolerance

2.3 Application:
Workpiece: ☐ Stationary ☐ Rotating
Tool: ☐ Stationary ☐ Rotating

3. Machine
3.1 Technical Data
Machine Type.....
Power ..... kW .....

Sketch of drilling application

Note: It may be necessary to change several of the parameters that you indicated, based on our experience with your application.

3.2 Cutting Data:
Cutting Speed Vc ..... m/min .....
Revolutions Nmin ..... **RPM**, Nmax ..... **RPM**
Feed Fmin..... mm/rev,
Fmax..... mm/rev.....
Feed Rate **VF** ..... mm/min .....

Coolant:
☐ Oil ☐ Soluble Oil ☐ Other
Coolant Pressure: ..... Bar .....

Specially Tailored TRIDEEP Code Key

GD - DH ##.## - #### - ##

Dia.	Drilling length	Shank Type

ISO	Material		Condition	Tensile Strength [N/mm2]	Hardness HB
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125
		>= 0.25 %C	Annealed	650	190
		< 0.55 %C	Quenched and tempered	850	250
		>= 0.55 %C	Annealed	750	220
			Quenched and tempered	1000	300
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200
			Quenched and tempered	930	275
				1000	300
				1200	350
	High alloyed steel, cast steel, and tool steel		Annealed	680	200
			Quenched and tempered	1100	325
	Stainless steel		Ferritic/martensitic	680	200
			Martensitic	820	240
M	Stainless steel		Austenitic	600	180
K	Grey cast iron (GG)		Ferritic/pearlitic		180
			Pearlitic		260
	Nodular cast iron (GGG)		Ferritic		160
			Pearlitic		250
	Malleable cast iron		Ferritic		130
			Pearlitic		230
N	Aluminum-wrought alloy		Not cureable		60
			Cured		100
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75
			Cured		90
		>12% Si	High temperature		130
	Copper alloys	>1% Pb	Free cutting		110
			Brass		90
			Electrolitic copper		100
	Non-metallic		Duroplastics, fiber plastics		
			Hard rubber		
S	High temp. alloys	Fe based	Annealed		200
			Cured		280
		Ni or Co based	Annealed		250
			Cured		350
			Cast		320
	Titanium Ti alloys			RM 400	
			Alpha+beta alloys cured	RM 1050	

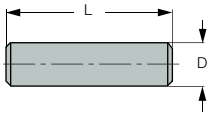
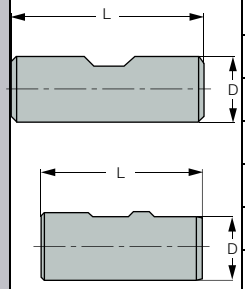
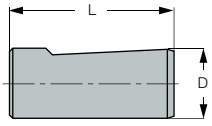
Machining Recommendations for TRIDEEP Drills

Material No.	TRIDEEP Gundrills		TRIDEEP BTA Drilling Heads	
		Feed Rate (mm/rev)		Feed Rate (mm/rev)
	Cutting Speed (m/min)	Drill Dia. Dc (mm) 16.00-28.00	Cutting Speed (m/min)	Drill Dia. Dc (mm) 16.00-28.00
1	80-140	0.10-0.20	90-130	0.15-0.20
2	80-140	0.10-0.20	90-130	0.15-0.20
3	80-140	0.10-0.20	90-130	0.15-0.20
4	80-140	0.10-0.20	70-130	0.10-0.25
5	80-140	0.10-0.20	70-130	0.10-0.25
6	80-120	0.10-0.20	70-120	0.10-0.25
7	80-120	0.10-0.20	60-120	0.10-0.25
8	80-120	0.10-0.20	60-120	0.10-0.25
9	80-120	0.10-0.20	60-120	0.10-0.25
10	80-120	0.10-0.20	70-130	0.10-0.25
11	80-120	0.10-0.20	70-130	0.10-0.25
12	80-140	0.08-0.10	80-130	0.06-0.10
13	80-140	0.08-0.10	80-130	0.06-0.10
14	80-140	0.08-0.10	80-130	0.06-0.10
15	80-140	0.10-0.30	50-110	0.10-0.20
16	80-140	0.10-0.30	50-110	0.10-0.20
17	80-140	0.10-0.30	60-110	0.10-0.20
18	80-140	0.10-0.30	60-110	0.10-0.20
19	80-140	0.10-0.30	70-110	0.10-0.20
20	80-140	0.10-0.30	70-110	0.10-0.20
21	65-130	0.10-0.20	65-130	0.10-0.20
22	65-130	0.08-0.18	65-130	0.08-0.18
23	65-130	0.08-0.18	65-130	0.08-0.18
24	65-130	0.08-0.18	65-130	0.08-0.18
25	65-130	0.08-0.18	65-130	0.08-0.18
26	65-130	0.08-0.18	65-130	0.08-0.18
27	65-130	0.08-0.18	65-130	0.08-0.18
28	65-130	0.08-0.18	65-130	0.08-0.18
29	65-130	0.08-0.18	65-130	0.08-0.18
30	65-130	0.08-0.18	65-130	0.08-0.18
31	20-50	0.08-0.18	20-50	0.08-0.18
32	20-50	0.08-0.18	20-50	0.08-0.18
33	20-50	0.08-0.18	20-50	0.08-0.18
34	20-50	0.08-0.18	20-50	0.08-0.18
35	20-50	0.08-0.18	20-50	0.08-0.18
36	30-60	0.08-0.18	30-60	0.08-0.18
37	30-60	0.08-0.18	30-60	0.08-0.18

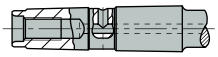
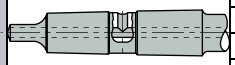
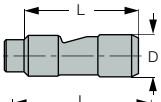
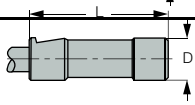
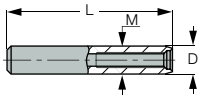
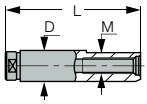
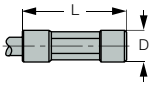
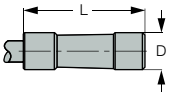
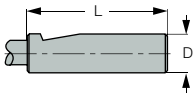
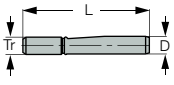
Standard Gundrill Drivers for Machining Centers, Lathes, etc.

Drivers

Drivers are available for dedicated and **CNC** machines, for any specified diameter and length. Below are the driver codes and technical data.

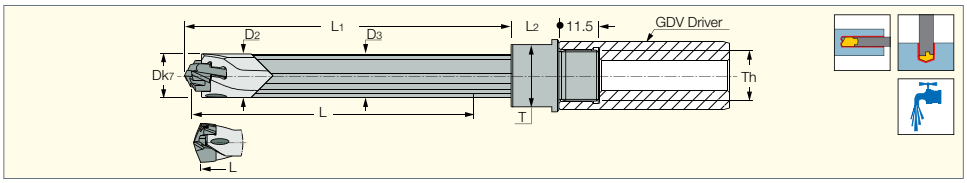
Driver Type	Drawing	øD x L	Driver Code
Cylindrical DIN1835A DIN6535HA		.75x2.03”	95
		20x50	10
		25x56	11
		1.00x2.28”	96
		1.25x2.28”	97
		32x60	12
		40x70	13
Weldon DIN1835B DIN6535HB		.75x2.03”	99
		20x50	22
		25x56	23
		1.00x2.28”	100
		1.25x2.28”	101
		32x60	24
		40x70	25
Whistle Notch DIN1835E		20x50	34
		25x56	35
		32x60	36
		40x70	37

Standard Drivers for Gundrill Machines

Driver Type	Drawing	øD x L	Driver Code
DIN228AK		CM1	45
		CM2	46
		CM3	47
		CM4	48
DIN228BK		CM1	49
		CM2	50
		CM3	51
		CM4	52
Central Clamping Surface 15°		.750x2.75”	56
		25x70	57
		1.00x2.75”	58
		1.25x2.75”	59
		1.50x2.75”	60
Frontal Clamping Surface 15°		16x50	61
Cylindrical with Thread		25x100 M16x1.5	66
		36x120 M24x1.5	67
VDI Design		25x112 M16x1.5	70
		36x135 M24x1.5	71
Central Clamping Hexagonal		25x70	72
		32x70	73
Central Clamping Tapered		.75x2.75”	76
		20x70	77
Frontal Clamping Surface 2°		1.00x2.75”	80
		1.00x3.94”	81
		1.25x2.75”	82
		1.25x3.94”	83
		1.50x2.75”	84
		1.50x3.94”	85
Trapezoidal Thread		28x126 Tr 28x2	88
		36x162 Tr 36x2	89
Spraymist Driver		25x50	91
		35x60	92

SUMOGUN

MNCNT-T2
Indexable SUMCHAM Inserts
and Modular Shank Gundrills

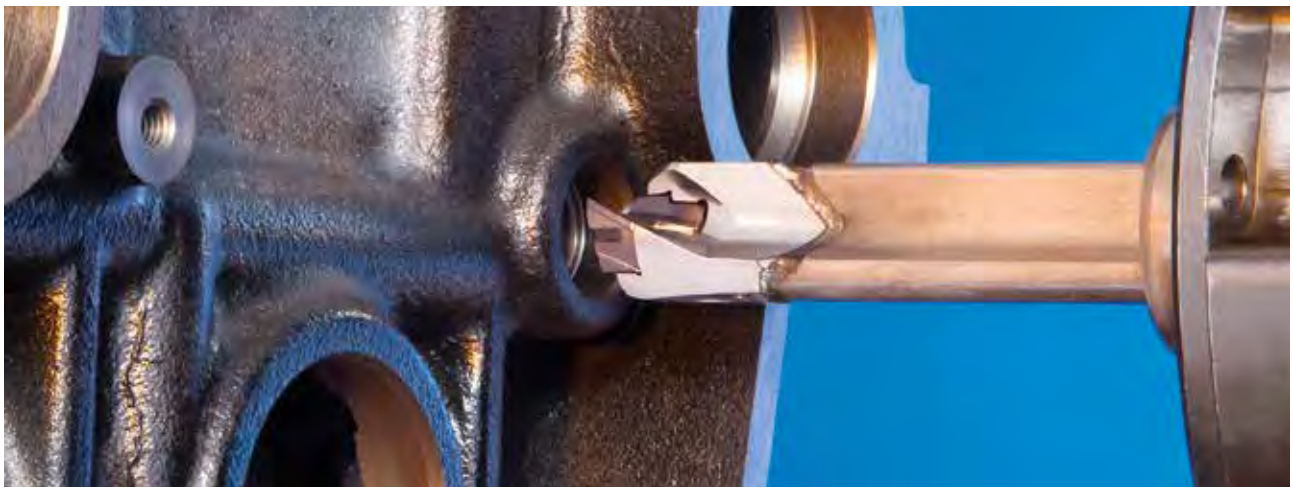


Designation	D min(1)	D max	D2	D3	Po. Size	L	L1	Th	L2	T	
MNCNT 100-400-MF16X1-T2	10.00	10.49	9.70	9.60	10.0	400.0	430.0	MF16X1	10.00	16.0	K DCN 10-13.99
MNCNT 100-800-MF16X1-T2	10.00	10.49	9.70	9.60	10.0	800.0	830.0	MF16X1	10.00	16.0	K DCN 10-13.99
MNCNT 105-400-MF16X1-T2	10.50	10.99	10.20	10.10	10.0	400.0	430.0	MF16X1	10.00	16.0	K DCN 10-13.99
MNCNT 105-800-MF16X1-T2	10.50	10.99	10.20	10.10	10.0	800.0	830.0	MF16X1	10.00	16.0	K DCN 10-13.99
MNCNT 110-400-MF16X1-T2	11.00	11.49	10.70	10.60	11.0	400.0	430.0	MF16X1	10.00	16.0	K DCN 10-13.99
MNCNT 110-800-MF16X1-T2	11.00	11.49	10.70	10.60	11.0	800.0	830.0	MF16X1	10.00	16.0	K DCN 10-13.99
MNCNT 115-400-MF16X1-T2	11.50	11.99	11.20	11.10	11.0	400.0	430.0	MF16X1	10.00	16.0	K DCN 10-13.99
MNCNT 115-800-MF16X1-T2	11.50	11.99	11.20	11.10	11.0	800.0	830.0	MF16X1	10.00	16.0	K DCN 10-13.99
MNCNT 120-400-MF16X1-T2	12.00	12.49	11.70	11.60	12.0	400.0	430.0	MF16X1	10.00	16.0	K DCN 10-13.99
MNCNT 120-800-MF16X1-T2	12.00	12.49	11.70	11.60	12.0	800.0	830.0	MF16X1	10.00	16.0	K DCN 10-13.99
MNCNT 125-400-MF16X1-T2	12.50	12.99	12.20	12.10	12.0	400.0	430.0	MF16X1	12.00	16.0	K DCN 10-13.99
MNCNT 125-800-MF16X1-T2	12.50	12.99	12.20	12.10	12.0	800.0	830.0	MF16X1	12.00	16.0	K DCN 10-13.99
MNCNT 130-400-MF16X1-T2	13.00	13.49	12.70	12.60	13.0	400.0	430.0	MF16X1	12.00	16.0	K DCN 10-13.99
MNCNT 130-800-MF16X1-T2	13.00	13.49	12.70	12.60	13.0	800.0	830.0	MF16X1	12.00	16.0	K DCN 10-13.99
MNCNT 135-400-MF16X1-T2	13.50	13.99	13.20	13.10	13.0	400.0	430.0	MF16X1	12.00	16.0	K DCN 10-13.99
MNCNT 135-800-MF16X1-T2	13.50	13.99	13.20	13.10	13.0	800.0	830.0	MF16X1	12.00	16.0	K DCN 10-13.99
MNCNT 140-400-MF16X1-T2	14.00	14.49	13.70	13.60	14.0	400.0	430.0	MF16X1	12.00	16.0	K DCN 10-13.99
MNCNT 140-800-MF16X1-T2	14.00	14.49	13.70	13.60	14.0	800.0	830.0	MF16X1	12.00	16.0	K DCN 14-17.99
MNCNT 145-400-MF16X1-T2	14.50	14.99	14.20	14.10	14.0	400.0	430.0	MF16X1	12.00	16.0	K DCN 14-17.99
MNCNT 145-800-MF16X1-T2	14.50	14.99	14.20	14.10	14.0	800.0	830.0	MF16X1	12.00	16.0	K DCN 14-17.99
MNCNT 150-400-MF16X1-T2	15.00	15.99	14.70	14.60	15.0	400.0	430.0	MF16X1	12.00	16.0	K DCN 14-17.99
MNCNT 150-800-MF16X1-T2	15.00	15.99	14.70	14.60	15.0	800.0	830.0	MF16X1	12.00	16.0	K DCN 14-17.99
MNCNT 160-400-MF20X1-T2	16.00	16.99	15.50	15.40	16.0	400.0	430.0	MF20X1	12.00	22.0	K DCN 14-17.99
MNCNT 160-800-MF20X1-T2	16.00	16.99	15.50	15.40	16.0	800.0	830.0	MF20X1	12.00	22.0	K DCN 14-17.99
MNCNT 170-400-MF20X1-T2	17.00	17.99	16.50	16.40	17.0	400.0	430.0	MF20X1	12.00	22.0	K DCN 14-17.99
MNCNT 170-800-MF20X1-T2	17.00	17.99	16.50	16.40	17.0	800.0	830.0	MF20X1	12.00	22.0	K DCN 14-17.99
MNCNT 180-400-MF20X1-T2	18.00	18.99	17.50	17.40	18.0	400.0	430.0	MF20X1	12.00	22.0	K DCN 18-21.99
MNCNT 180-800-MF20X1-T2	18.00	18.99	17.50	17.40	18.0	800.0	830.0	MF20X1	12.00	22.0	K DCN 18-21.99
MNCNT 190-400-MF20X1-T2	19.00	19.99	18.50	18.40	19.0	400.0	430.0	MF20X1	12.00	22.0	K DCN 18-21.99
MNCNT 190-800-MF20X1-T2	19.00	19.99	18.50	18.40	19.0	800.0	830.0	MF20X1	12.00	22.0	K DCN 18-21.99
MNCNT 200-400-MF20X1-T2	20.00	20.99	19.50	19.40	20.0	400.0	430.0	MF20X1	14.00	22.0	K DCN 18-21.99
MNCNT 200-800-MF20X1-T2	20.00	20.99	19.50	19.40	20.0	800.0	830.0	MF20X1	14.00	22.0	K DCN 18-21.99
MNCNT 210-400-MF20X1-T2	21.00	21.99	20.50	20.40	21.0	400.0	430.0	MF20X1	14.00	22.0	K DCN 18-21.99
MNCNT 210-800-MF20X1-T2	21.00	21.99	20.50	20.40	21.0	800.0	830.0	MF20X1	14.00	22.0	K DCN 18-21.99
MNCNT 220-400-MF20X1-T2	22.00	22.99	21.50	21.40	22.0	400.0	430.0	MF20X1	14.00	22.0	K DCN 22-26.99
MNCNT 220-800-MF20X1-T2	22.00	22.99	21.50	21.40	22.0	800.0	830.0	MF20X1	14.00	22.0	K DCN 22-26.99
MNCNT 230-400-MF20X1-T2	23.00	23.99	22.50	22.40	23.0	400.0	430.0	MF20X1	14.00	22.0	K DCN 22-26.99
MNCNT 230-800-MF20X1-T2	23.00	23.99	22.50	22.40	23.0	800.0	830.0	MF20X1	14.00	22.0	K DCN 22-26.99
MNCNT 240-400-MF20X1-T2	24.00	24.99	23.50	23.40	24.0	400.0	430.0	MF20X1	14.00	22.0	K DCN 22-26.99
MNCNT 240-800-MF20X1-T2	24.00	24.99	23.50	23.40	24.0	800.0	830.0	MF20X1	14.00	22.0	K DCN 22-26.99
MNCNT 250-400-MF20X1-T2	25.00	25.99	24.50	24.50	25.0	400.0	430.0	MF20X1	14.00	22.0	K DCN 22-26.99
MNCNT 250-800-MF20X1-T2	25.00	25.99	24.50	24.50	25.0	800.0	830.0	MF20X1	14.00	22.0	K DCN 22-26.99

• For user guide and cutting conditions, see page 656

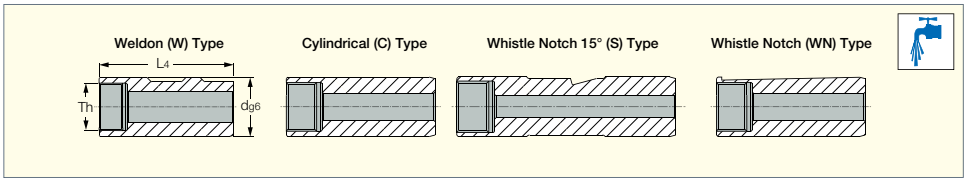
(1) Do not mount smaller drilling heads than the specified range of the drill body

For inserts, see pages: HCP-IQ (483) • ICK (484) • ICK-2M (485) • ICP (484) • ICP-2M (485)
For holders, see pages: GDV (656)



SUMOGUN

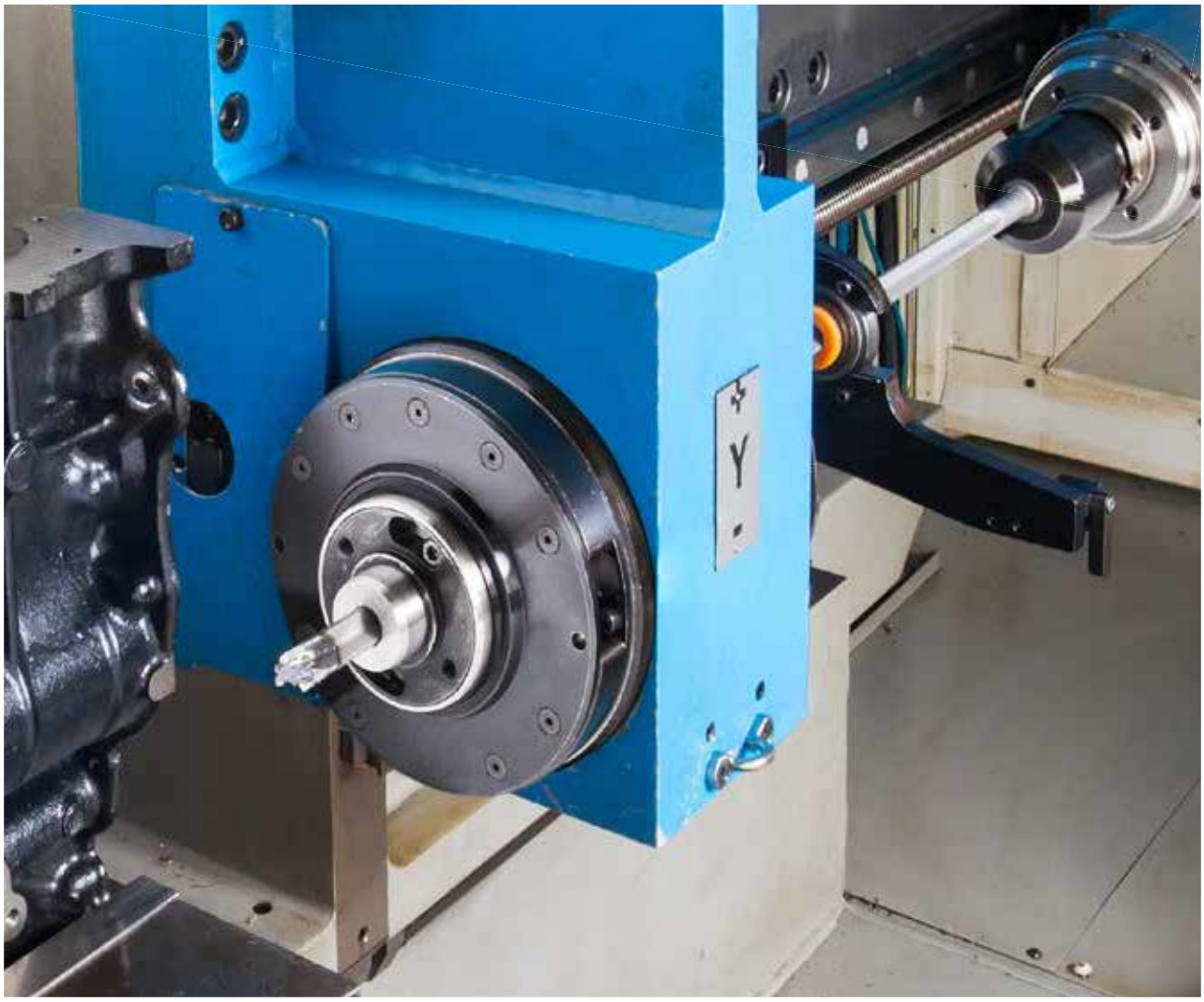
GDV
Shanks for SUMOGUN Modular Gundrills with Threaded Connection



Designation	Th	d	Shank(1)	L4
GDV56-MF16X1-I-WN.75"	MF16X1	19.05	S	69.8
GDV99-MF16X1-I-W.75"	MF16X1	19.05	W	69.8
GDV10-MF16X1-M-C20	MF16X1	20.00	C	50.0
GDV22-MF16X1-M-W20	MF16X1	20.00	W	50.0
GDV80-MF16X1-I-WN1.00"	MF16X1	25.40	WN	69.8
GDV11-MF20X1-M-C25	MF20X1	25.00	C	56.0
GDV23-MF20X1-M-W25	MF20X1	25.00	W	56.0
GDV57-MF20X1-M-WN25	MF20X1	25.00	S	70.0
GDV100-MF20X1-I-W1.00"	MF20X1	25.40	W	57.9
GDV58-MF20X1-I-WN1.00"	MF20X1	25.40	S	69.8
GDV101-MF20X1-I-W1.25"	MF20X1	31.75	W	57.9
GDV97-MF20X1-I-C1.25"	MF20X1	31.75	C	57.9
GDV12-MF20X1-M-C32	MF20X1	32.00	C	60.0
GDV24-MF20X1-M-W32	MF20X1	32.00	W	60.0
GDV13-MF20X1-M-C40	MF20X1	40.00	C	70.0
GDV25-MF20X1-M-W40	MF20X1	40.00	W	70.0

(1) W-Weldon, C-Cylindrical, S-Whistle notch 15°, WN-Whistle notch

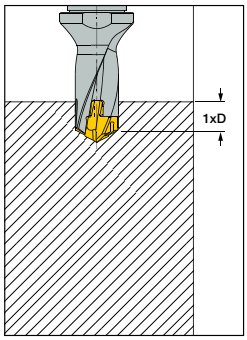
For tools, see pages: MNCNT-T2 (655)



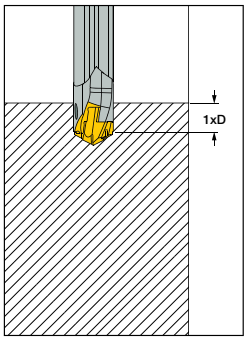
Drill Penetration Instructions on Milling or Turning Machines:
Note: The following procedure (1-4) is recommended for up to 400 mm hole depths using **MNCNT …**-400… drills
For hole depths between 400 up to 800 mm, use **MNCNT …**-800… drill only after reaching 400 mm depth with an **MNCNT …**-400… drill.

1. Drill a pilot hole 0.5xD deep with a short drill in the same diameter as of the **SUMOGUN** drill.
2. Enter the pre-hole at slow speed, feed and 50 **RPM** until 1-2 mm before reaching the bottom.
3. Activate the cooling system and increase rotation speed to recommended drilling speed, maintain for 2-3 seconds, then continue at recommended drilling feed. **No pecking is required.** Apply maximum possible coolant flow rate.
4. After having reached the required depth, reduce speed to 50-100 **RPM** while exiting from the hole.

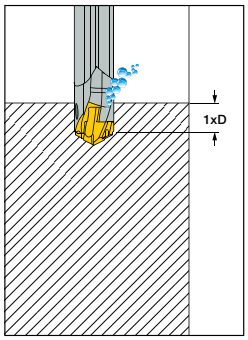
1. Pre-hole 1xD deep for centering



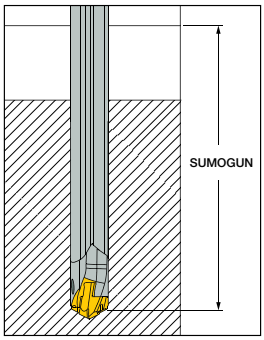
2. Slow rotation and feed while entering to the pre-hole



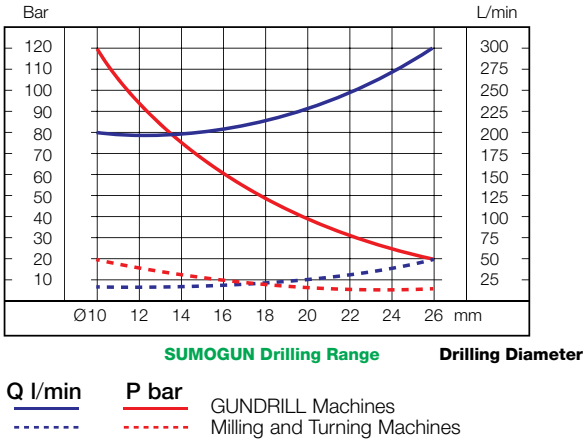
3. Maintain for 2-3 seconds and activate the cooling system



4. Continue drilling at recommended cutting conditions



Pressure and Coolant Flow Rate for SUMOGUN



Guidelines for Optimal Gundrill Performance

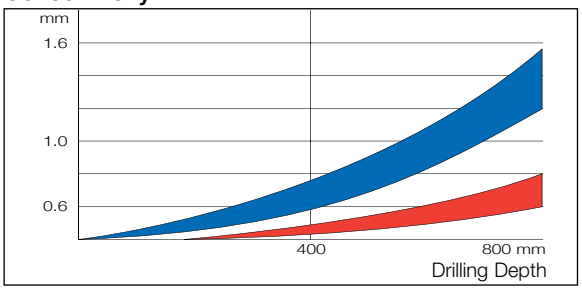
- Coolant pressure and flow
  It is recommended to use a strong coolant flow for efficient chip flushing and cooling of the cutting edge
- Filtration
  It is recommended to use a filter under 20 µm.
  Note: Improper filtration may result in interrupted flow of the lubricating oil. This creates a sticky surface on the bearing pads and leads to premature wear of the tool and overloading the coolant pump and spindle seals.
- Temperature of the coolant
  The coolant temperature should be between 20 and 22° C.

Note: Above 50° C the viscosity of the coolant is reduced by 50% and becomes ineffective.

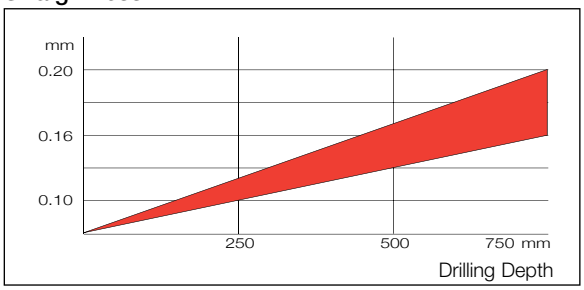
Gundrill Lubrication and Cooling

The best performance is obtained by using oil.
On equipment that uses water-soluble fluids (i.e. machining centers and **CNC** machines) a concentration between 10% and 15% is recommended.

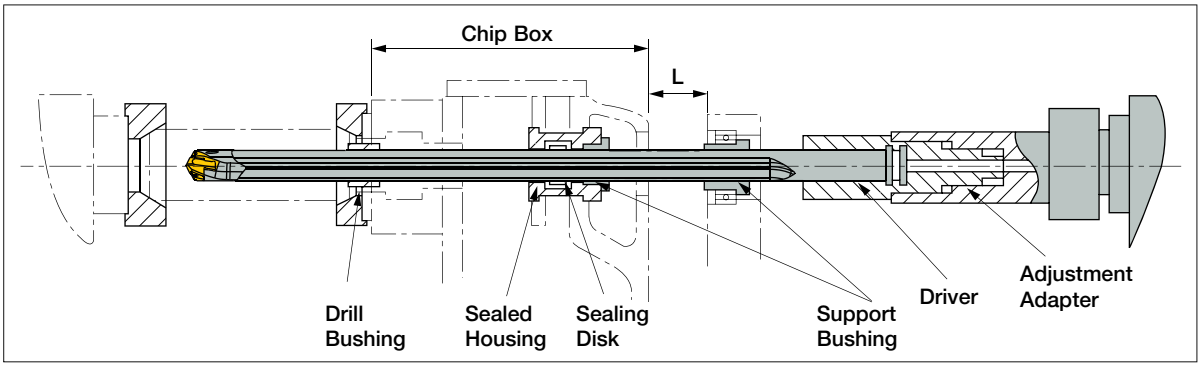
Concentricity



Straightness



Stationary workpiece – rotating tool Rotating workpiece – stationary tool



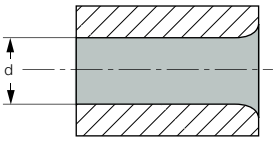
L = 20xD

1- The support bushing should be according to tube diameter (D3) (see page 658)

Bushing

Based on modified **DIN** 179 specify the "d" diameter of the drill head. Carbide bushing is delivered only on request.

d = Drill diameter +0.02

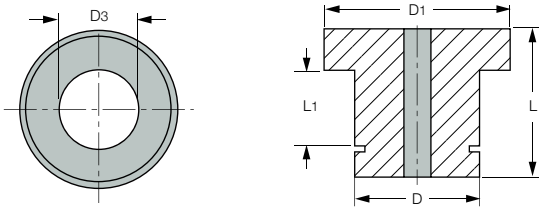


Guide Bushing

A guide bushing is an essential component for a proper gundrill operation. The function of the guide bushing is to direct the SUMOGUN into the material during penetration. The diameter of the guide bushing should be within 20 microns larger than the diameter of the drill. Dedicated gundrill machines are equipped with a guide bushing system.

Support Bushing

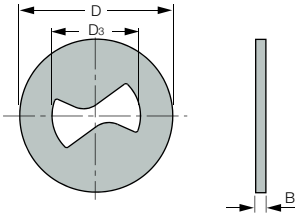
D3 indicate the tube diameter



Support Bushing				
D3	Ext. Ø "D"	Ext. Ø "D1"	Length "L"	Length "L1"
9.6 - 16,399	20	26	20	12
9.6 - 25,999	30	38	26	16
9.6 - 25,999	45	50	26	16

Sealing Disk

Indicate the dimensions needed for your requirements



Sealing Disk		
D3	Ext. Ø "D"	Thick. " B"
9.6 to 15,559	32	4
15,6 to 25,999	40	4

Recommended Machining Conditions

Material Groups

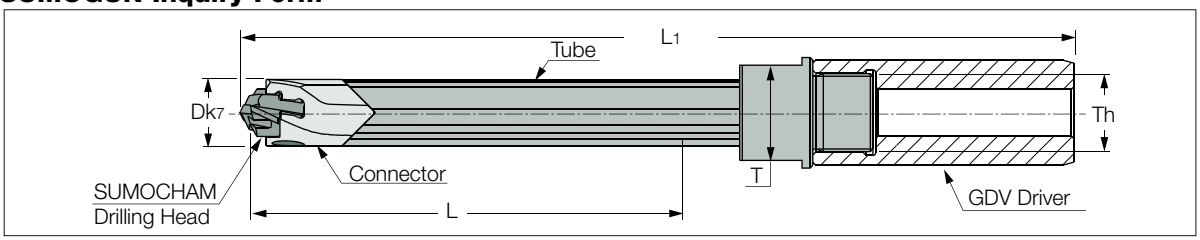
ISO	Material		Condition	Tensile Strength Rm [N/mm2]	Hardness HB	Mtl. No.
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1
		> = 0.25 %C	Annealed	650	190	2
		< 0.55 %C	Quenched and tempered	850	250	3
		> = 0.55 %C	Annealed	750	220	4
			Quenched and tempered	1000	300	5
	Low alloy steel and cast steel (less than 5% alloying elements)		Annealed	600	200	6
			Quenched and tempered	930	275	7
				1000	300	8
				1200	350	9
	High alloy steel, cast steel and tool steel		Annealed	680	200	10
			Quenched and tempered	1100	325	11
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15
			Pearlitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20

Recommended Machining Conditions for SUMOGUN

		SUMOGUN				
		Feed vs. Drill Diameter				
Mtl. No.	Vc m/min	D=10-11.9	D=12-13.9	D=14-15.9	D=16-19.9	D=20-25.9
		mm/rev				
1	60-**90**-110	0.10 **0.14** 0.18	0.11 **0.16** 0.20	0.13 **0.18** 0.24	0.13 **0.19** 0.25	0.14 **0.20** 0.27
2	60-**80**-100					
3	60-**80**-100					
4	50-**70**-90					
5	40-**50**-70					
6	50-**70**-100	0.10 **0.14** 0.18	0.10 **0.15** 0.20	0.12 **0.17** 0.22	0.12 **0.18** 0.24	0.13 **0.20** 0.26
7	50-**70**-90					
8	40-**50**-70					
9	30-**40**-50					
10	40-**50**-70	0.09 **0.14** 0.18	0.09 **0.14** 0.18	0.10 **0.15** 0.20	0.10 **0.16** 0.22	0.11 **0.17** 0.24
11	30-**40**-60					
15	60-**80**-100	0.16 **0.20** 0.25	0.18 **0.22** 0.28	0.18 **0.22** 0.28	0.18 **0.22** 0.28	0.18 **0.22** 0.28
16	60-**90**-100					
17	60-**100**-120					
18	60-**90**-110					
19	70-**100**-120					
20	60-**90**-110					

Recommended cutting data

SUMOGUN Inquiry Form



1. Tool
Quantity.....
Nominal diameter and tolerance .....
Please fill in dimensions on the sketch below.

Driver
Driver: for standard drivers please use codes from page 656.....
☐ Code No.
☐ Special, please attach sketch and specifications.

2. Workpiece
(If possible, please attach a drawing)
2.1 Material
Material description (**DIN** material number or any other standard):
.....
Hardness and Properties:
.....
☐ Short Chips ☐ Long Chips

2.2 Hole Type
☐ Blind Hole ☐ Drilling into Pre-hole
☐ Angled Entry ☐ Drilling into Solid
☐ Boring ☐ Angled Exit
Drilling Depth mm Hole Tolerance

2.3 Application:
Workpiece: Stationary : Rotating
Tool: Stationary : Rotating

3. Machine
3.1 Technical Data

Sketch of drilling application

Note: It may be necessary to change several of the parameters that you indicated, based on our experience with your application.

Machine Type.....
Power: ..... kW .....

3.2 Cutting Data:
Cutting Speed Vc ..... m/min .....
Revolutions Nmin ..... **RPM**, Nmax ..... **RPM**
Feed Fmin..... mm/rev,
Fmax..... mm/rev.....
Feed Rate **VF** ..... mm/min .....

Coolant:
☐ Oil ☐ Soluble Oil Other
Coolant Pressure ..... Bar .....

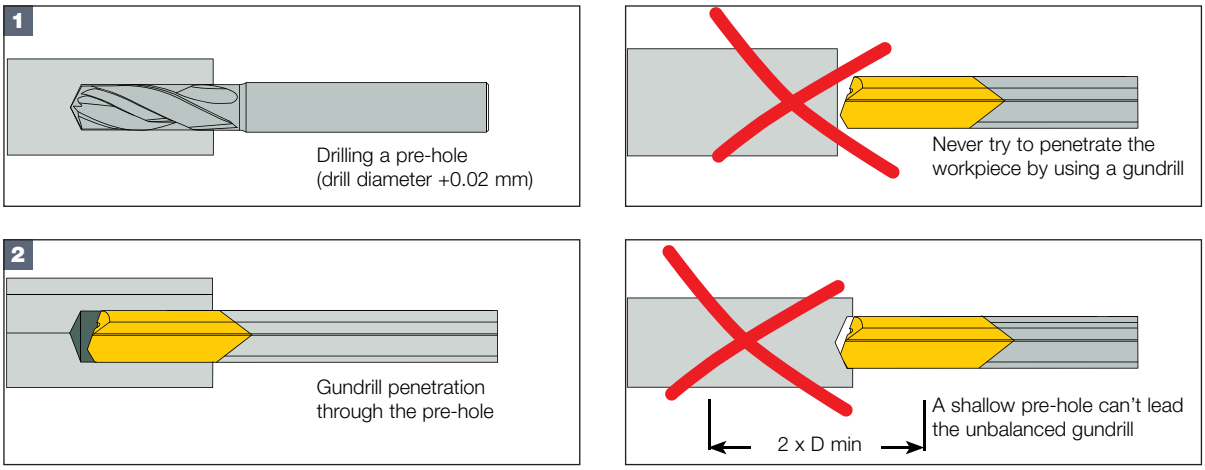
Specially Tailored SUMOGUN Code Key

Machine Type	Designation	D Required	L Drilling Length	L_1 Total Length	Driver (1) Code
For GUNDRILL machines	**MNGDT 1500-1000-MF##X1-T2** **D L_1 Driver Code** **D L1 Driver Code**	15.00	920	1000	23
For other machine tools	**MNCNT 1500- 920-MF##X1-T2** **D L Driver Code**	15.00	920	1000	23

(1) see page 656

Drilling Head Mounting Procedure

When using a gundrill on a lathe machine, a short solid carbide centering drill should be used prior to the gundrill. Once the gundrill enters the pre-drilled hole, it is self-guided.

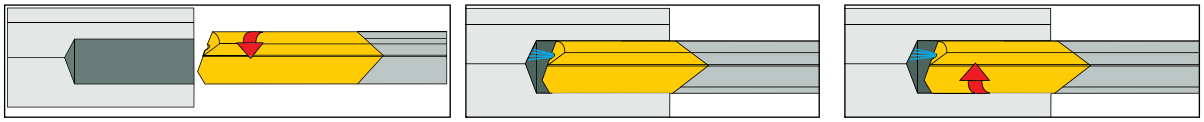


Drill Penetration Instructions

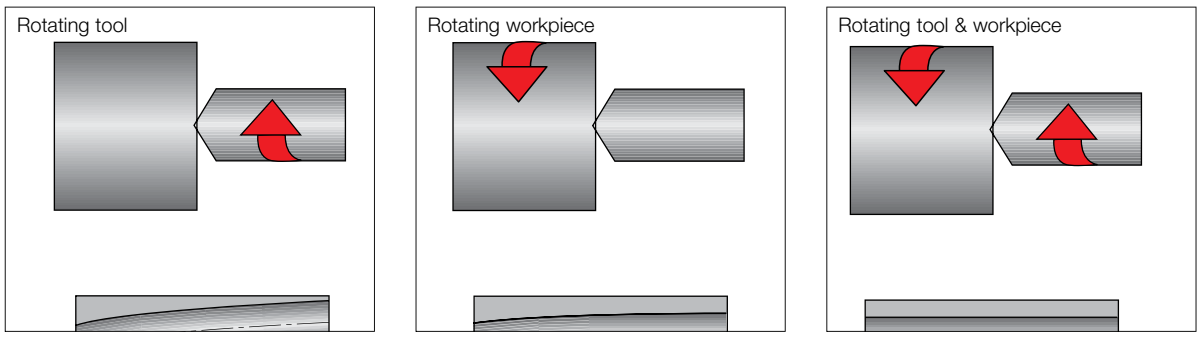
1 Rotate the drill counterclockwise prior to and during hole penetration

2 Stop the drill rotation and start the coolant

3 Rotate the drill clockwise prior to drilling operation

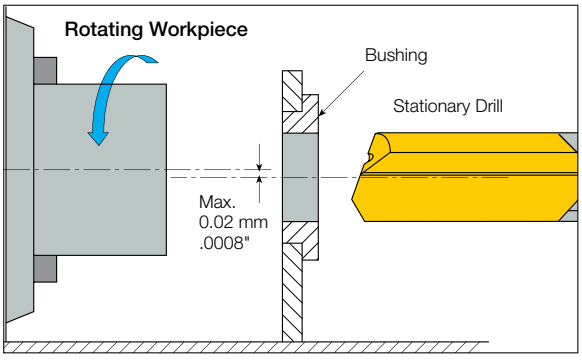


The Influence of Tool vs. Workpiece Rotation



Worst **Medium** **Best**

The maximum misalignment between the drill bushing and the workpiece center line should not exceed 0.02 mm (.0008").



Single Flute Gundrill

ISCAR's gundrill consists of a single piece carbide head, a streamlined shank and a driver through which coolant flows to the working end where it is most needed. Chips are evacuated along the V-shaped external flute.

Drilling Head

The carbide head is tapered on its length to reduce friction. The taper angle depends on the type of material to be drilled. For high precision drilling, the taper should be reduced to a minimum.
Note that when the head is resharpened, the diameter of the drill changes, affecting the hole tolerance.

Shank

The cross-section of the shank is V-shaped with coolant holes. It is made of hardened steel that is highly resistant to twisting. This cross-section provides the optimal conditions for twist resistance, coolant flow and chip evacuation.

Driver

The driver ensures the connection between the gundrill and the machine tool, (see page 664 for detailed driver information).

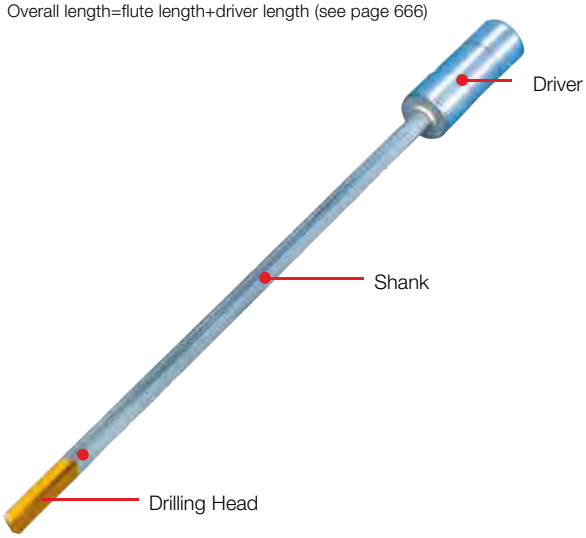
Advantages

- Drilling precision of **IT7** to **IT9** tolerances can be reached
- Excellent straightness and concentricity
- Maintains high precision hole center alignment
- Surface roughness of **R0.**4 - **R1.**6 is easily obtained
- Reboring operations are often unnecessary

Carbide Tipped Gundrill Range

Drill Diameter	Max. Flute Length
2.50 to 3.09	1100
3.10 to 5.99	2500
6.00 to 11.39	3000
11.40 to 40.00	3500

Overall length=flute length+driver length (see page 666)



ISCAR's advanced gundrill technology provides superior geometric and dimensional quality for both deep and shallow drilling.
The drills are available in the range of 2.5 to 40 mm.

Single Flute Solid Carbide Gundrills

Another type of gundrill is made with integral tip and shank, made of solid carbide with either a steel or a carbide driver. These drills are designed for conventional machines, machining centers and lathes. This style of gundrill is available from 0.9-16 mm and can be used on various types of materials. It provides superior rigidity and optimal coolant flow rates. As a result of its rigidity, up to 100% higher feed rate can be reached. When using the small diameter drills, it is crucial to adhere closely to the recommended drilling parameters.

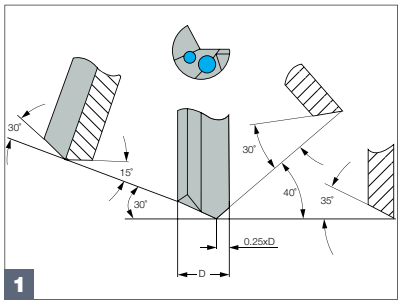
Solid Carbide Gundrill Range

(with or without brazed steel driver)

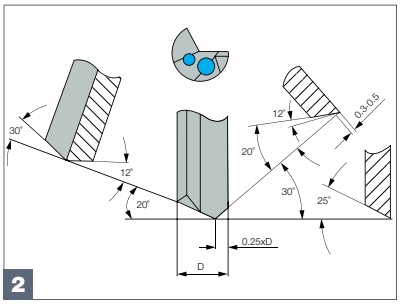
Drill Diameter	Max. Flute Length
0.9 to 16.00	300 mm

Standard Gundrill Head Sharpening Angles

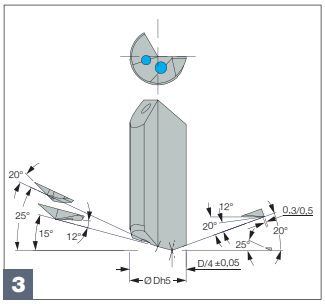
Subject to the required tolerance, cutting performance and desired chip shape, the following standard sharpening angles are recommended (shown in figures 1 and 2).



Standard sharpening for 0.9 to 4 mm drill diameters



Standard sharpening for 4 to 32 mm drill diameters



Standard sharpening for 32 to 40 mm drill diameters

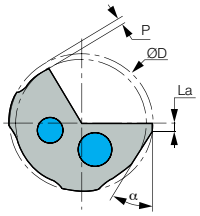
Note: For special or semi-standard gundrills, special geometries will be offered to match the application.

Standard Gundrill Head Profiles

Drilling capacity and finish of the drilled hole are dependent on the geometrical shape of the drill head. Both the profile and the sharpening must be matched to the workpiece material. The profile is defined when the tool is manufactured. Although regrinding may change the cutting geometry, the profile should remain the same.

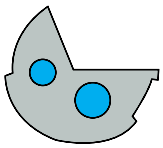
General Sketch

All cross section profile parameters such as: P, La and must be precisely matched to the workpiece material properties.



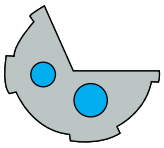
Profile G (Universal)

Standard form for most material types, particularly for materials with a tendency to shrink. Recommended for high precision bore tolerance and straightness. Maintains precise exit hole size. Recommended when extra burnishing is required.



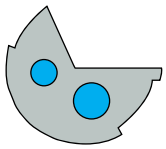
Profile A

Suitable for cast iron (usually coated) and aluminum alloys. Can be used for cross drilling, angular entry or exit and for interrupted cut. Large coolant gaps between pads.



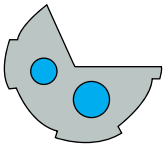
Profile B

Excellent size control, for high precision hole tolerance. Used for cast iron and aluminum alloys.



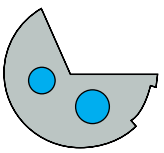
Profile C

Used for angled entry or exit. Large back taper, for shrinking materials such as types of alloys and stainless steel. Large coolant gaps between pads.



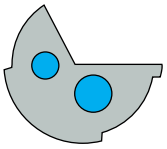
Profile D

Suitable for cast iron only. Very effective in grey cast iron (usually coated).



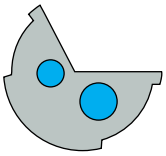
Profile E

General use, for alloys and stainless steel. This profile eliminates the problem of the tool sticking in the hole after the outer corner dulls. Especially suitable for crankshaft and other forged materials. Recommended for accurate hole straightness.



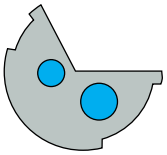
Profile H

Recommended for all nonferrous and cast iron materials up 5 mm diameter. Sometimes used for wood and plastic with larger back taper.

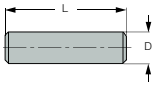
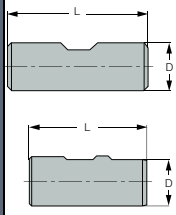
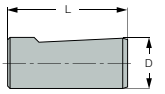
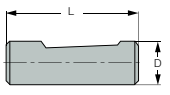


Profile I

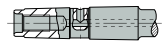
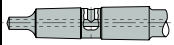
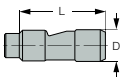
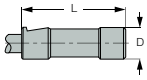
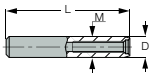
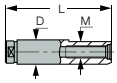
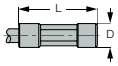
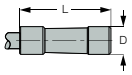
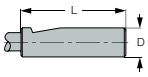
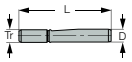
Used for aluminum and brass for best hole finish. For intersecting holes and interrupted cut or when extra outer diameter support and burnishing is required.



Standard Gundrill Drivers for Machining Centers, Lathes, etc.

Driver Type	Drawing	DXL	Driver code	BRAZED GUNDRILL F = CYLINDRICAL TUBE: Max. cutting diameter	BRAZED GUNDRILL F = CYLINDRICAL TUBE: Equal or less than max. cutting diameter	BRAZED GUNDRILL F = CYLINDRICAL TUBE: More than max. diameter	SOLID CARBIDE GUNDRILL: F = Straightening extension
Cylindrical DIN1835A DIN6535HA		4x28	N°1	2.749	10	20	18
		5x28	N°2	3.249	10	20	15
		6x36	N°3	4.249	10	20	14
		8x36	N°4	5.749	10	20	14
		10x40	N°5	7.299	10	20	15
		12x45	N°6	8.999	10	20	15
		.50x1.78"	N°94	9.699	10	20	15
		14x45	N°7	10.999	10	20	15
		16x48	N°8	12.399	10	20	15
		18x48	N°9	14.399	10	20	15
		.75x2.03"	N°95	14.899	10	20	15
		20x50	N°10	15.899	10	20	
		25x56	N°11	19.509	10	25	
		1.00x2.28"	N°96	19.509	10	25	
		1.25x2.28"	N°97	25.609	10	25	
		32x60	N°12	25.609	10	25	
		40x70	N°13	32.609	10	25	
		50x80	N°14	40	10	25	
		63x90	N°15	40	10	25	
Weldon DIN1835B DIN6535HB		6x36	N°16	2.749	10	20	15
		8x36	N°17	3.249	10	20	15
		10x40	N°18	7.299	10	20	15
		12x45	N°19	8.999	10	20	15
		.50x1.78"	N°98	9.699	10	20	15
		16x48	N°20	12.399	10	20	15
		18x48	N°21	14.399	10	20	15
		.75x2.03"	N°99	14.899	10	20	15
		20x50	N°22	15.899	10	20	15
		25x56	N°23	19.509	10	25	
		1.00x2.28"	N°100	19.509	10	25	
		1.25x2.28"	N°101	25.609	10	25	
		32x60	N°24	25.609	10	25	
		40x70	N°25	32.609	10	25	
		50x80	N°26	40	10	25	
		63x90	N°27	40	10	25	
Whistle Notch DIN1835E		6x36	N°28	2.749	10	20	
		8x36	N°29	3.249	10	20	
		10x40	N°30	7.299	10	20	15
		12x45	N°31	8.999	10	20	15
		16x48	N°32	12.399	10	20	15
		18x48	N°33	14.399	10	20	15
		20x50	N°34	15.899	10	20	15
		25x56	N°35	19.509	10	25	
		32x60	N°36	25.609	10	25	
		40x70	N°37	32.609	10	25	
Whistle Notch DIN6535HE		6x36	N°38	2.749	10	20	15
		8x36	N°39	3.249	10	20	15
		10x40	N°40	7.299	10	20	15
		12x45	N°41	8.999	10	20	15
		16x48	N°42	12.399	10	20	15
		18x48	N°43	14.399	10	20	15
		20x50	N°44	15.899	10	20	15

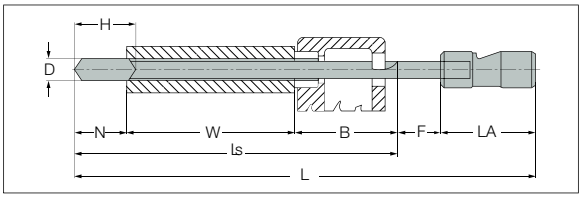
Standard Drivers for Gundrill Machines

Driver Type	Drawing	DXL	Driver code	BRAZED GUNDRILL F = CYLINDRICAL TUBE: Max. cutting diameter	BRAZED GUNDRILL F = CYLINDRICAL TUBE: Equal or less than max. cutting diameter	BRAZED GUNDRILL F = CYLINDRICAL TUBE: More than max. diameter	SOLID CARBIDE GUNDRILL F = Straightening extension
DIN228AK		CM1	N°45	9.599	10	20	
		CM2	N°46	14.599	10	20	
		CM3	N°47	21.499	10	25	
		CM4	N°48	29.499	10	25	
DIN228BK		CM1	N°49	9.599	10	20	
		CM2	N°50	14.599	10	20	
		CM3	N°51	21.499	10	25	
		CM4	N°52	29.499	10	25	
Central Clamping Surface 15°		6x30	N°53	2.749	10	20	20
		10x40	N°54	7.299	10	20	15
		16x45	N°55	12.399	10	20	
		.750x2.75”	N°56	14.899	10	20	
		25x70	N°57	19.509	10	25	
		1.00x2.75”	N°58	19.509	10	25	
		1.25x2.75”	N°59	25.609	10	25	
		1.50x2.75”	N°60	32.609	10	25	
Frontal Clamping Surface 15°		16x50	N°61	12.399	10	20	
Cylindrical with Thread		10x50 M6X0.5	N°62	7.299	10	20	15
		10x60 M6X0.5	N°63	7.299	10	20	
		.50x1.97” M6x0.5	N°64	8.999	10	20	15
		16x80 M10X1	N°65	12.399	10	20	15
		25x100 M16x1.5	N°66	19.509	10	25	
		36x120 M24x1.5	N°67	30.609	10	25	
VDI Design		10x68 M6x0.5	N°68	6.749	10	20	
		16x90 M10x1	N°69	10.799	10	20	15
		25x112 M16x1.5	N°70	19.509	10	25	
		36x135 M24x1.5	N°71	30.609	10	25	
Central Clamping Hexagonal		25x70	N°72	19.509	10	25	
		32x70	N°73	25.609	10	25	
Central Clamping Tapered		.50x1.50”	N°74	8.599	10	20	15
		16x70	N°75	12.099	10	20	15
		.75x2.75”	N°76	14.099	10	20	
		20x70	N°77	16.099	10	20	15
Frontal Clamping Surface 2°		.50x1.50”	N°78	9.699	10	20	
		.75x2.75”	N°79	14.899	10	20	
		1.00x2.75”	N°80	19.509	10	25	
		1.00x3.94”	N°81	19.509	10	25	
		1.25x2.75”	N°82	25.609	10	25	
		1.25x3.94”	N°83	25.609	10	25	
		1.50x2.75”	N°84	32.609	10	25	
		1.50x3.94”	N°85	32.609	10	25	
Trapezoidal Thread		16x112 Tr 16x1.5	N°86	13.599	10	20	
		20x126 Tr 20x2	N°87	17.099	10	20	
		28x126 Tr 28x2	N°88	25.599	10	25	
		36x162 Tr 36x2	N°89	32.599	10	25	
Spraymist Driver		16x40	N°90	12.399	10	20	
		25x50	N°91	19.509	10	25	
		35x60	N°92	26.599	10	25	

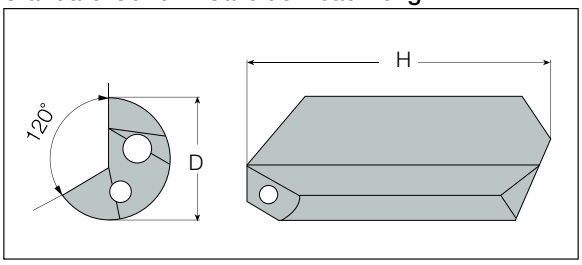
Drivers

Drivers are available for dedicated and **CNC** machines for any specified diameter and length.
Below are the driver codes and technical data.

Standard Gundrill Length Calculations



Standard Gundrill Carbide Head Length



D = Cutting diameter
H = Carbide length
N = Regrinding area = **H-D**
W= Hole depth
B = Chip evacuation area
= For typical gundrill machines, 250 mm
= For machining centers, 2xD (minimum 15 mm)
F = 10 mm.
LA = Driver length
LS = Flute length
L = Overall length

Example

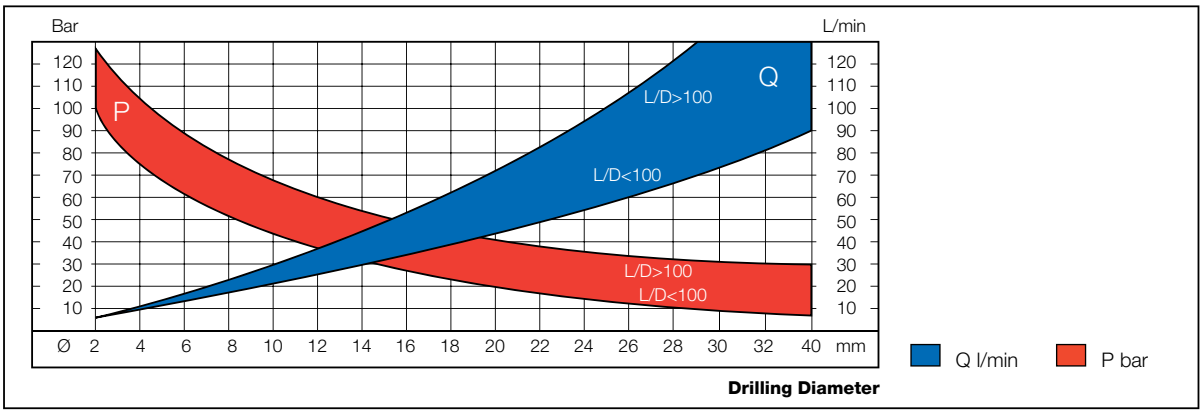
Drilling of a ø10x500 depth hole on a gundrill machine with ø25x70 mm driver code No. 57 (See page 664)
D=10 **W=**500 **LA=**70 **B=**250 (or per experience)
L=N+W+B+F+LA
L=(35-10)**+**500**+**250**+**13**+**70**=**858 (**OAL**)
Ls=**N+W+B=**770 (flute length)

Ordering Code
For example:
D and Ls are available as standard
STGD-10000-0858-57-**IC08**

Diameter Range	Head Length
2.50-3.80	20
3.80-4.05	23
4.05-5.05	25
5.05-6.55	30
6.55-11.05	35
11.05-18.35	40
18.35-21.35	45
21.35-23.35	50
23.35-26.35	55
26.35-32.00	65

Note: regrindable length=H-D

Pressure and Coolant Flow Rate for Gundrills



Gundrill Lubrication and Cooling

The best performance is obtained by using oil.
On equipment that uses water-soluble fluids (i.e. machining centers and **CNC** machines), a concentration between 10% and 15% is recommended.

Guidelines for Optimal Gundrill Performance

- It is recommended to use a strong coolant flow for efficient chip flushing and cooling of the cutting edge
- It is recommended to use a filter under 20 µm
  Note: Improper filtration may result in interrupted flow of lubricating oil. This creates a sticky surface on the bearing pads and leads to premature wear of thetool and overloading the coolant pump and spindle seals
- Temperature of the coolant should be between 20 and 22° C

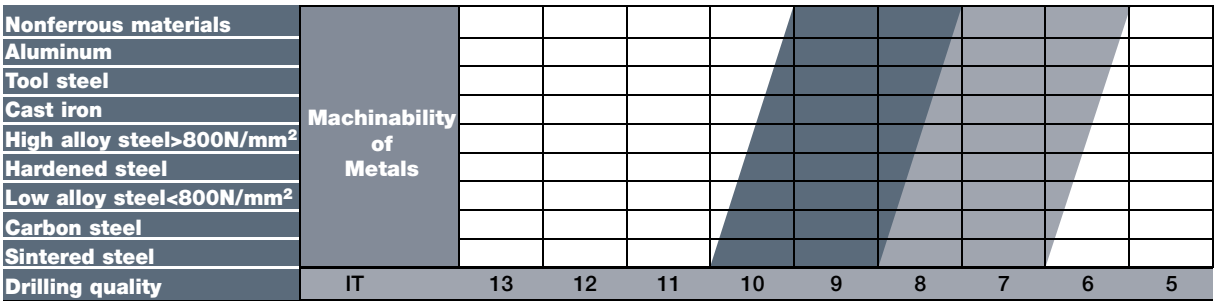
Note: Above 50° C the viscosity of the coolant is reduced by 50% and becomes ineffective.

Drilling Tolerances Obtainable In Deep Hole Drilling

Deep Drilling Tolerances

Gundrill configurations when used under recommended conditions can produce holes with tolerances of **IT8**-**IT9**.

When operating under optimal conditions, even better tolerances can be achieved.

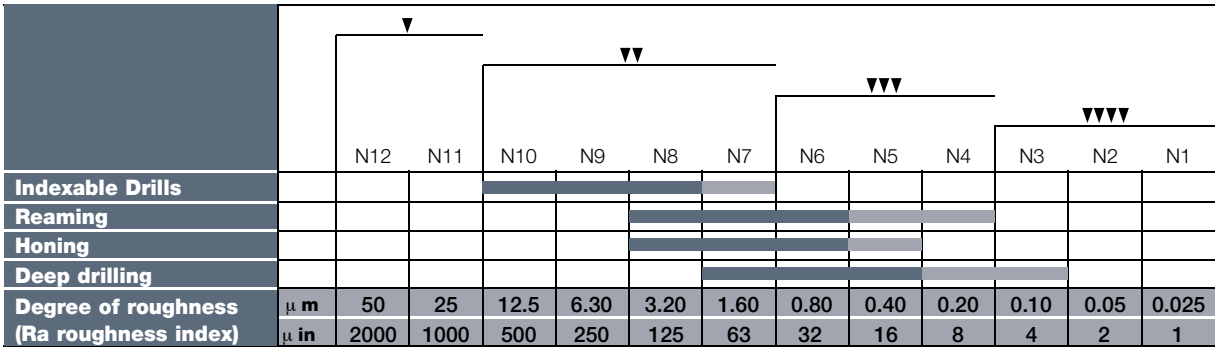


Tolerance range under normal conditions

Tolerance range under optimal conditions

Surface Quality

Surface quality of 0.2 Ra can be achieved when using gundrills under recommended conditions.



Tolerance range under normal conditions

Tolerance range under optimal conditions

Concentricity and Straightness

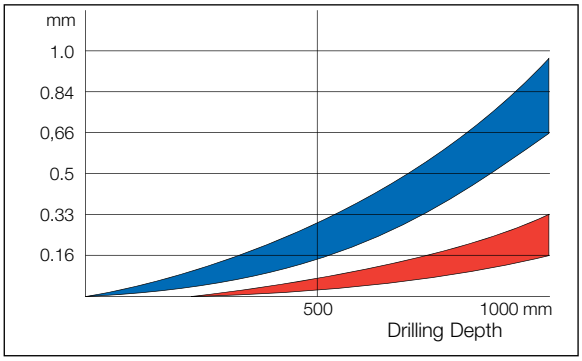
The resulting quality depends on different factors such as:

- Drilling depth and diameter
- Type of machining and cutting parameters
- Quality and uniformity of the workpiece material
- Machine tool conditions
- Gundrill support

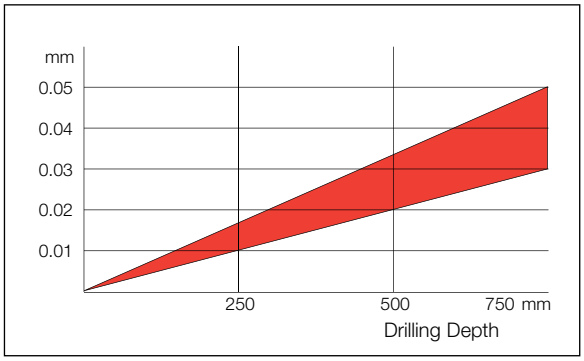
Circularity

The geometric quality of bores obtained from deep hole drill bits is clearly higher than that obtained with the use of twist drills. It is possible to obtain precision with deviations of less than 4µm.

Concentricity



Straightness



Stationary workpiece – rotating tool
Rotating workpiece – stationary tool

Delivery Schedule Based on Drill Dimensions for Carbide Tipped Gundrills

Single Flute Carbide Tipped Gundrill Designations

New Tools

Standard(1) Brazed Drill (Carbide Tipped):

Ordering Example:

STGD – 05500– 0500 - 57 - IC08

(The only available carbide grade)

Drill Diameter	Overall Length	Driver Type

Ø2.5 to **Ø20** each 0.1 mm and **Ø20** to **Ø32** each 1 mm Standard geometry suitable in any material Standard driver from the table (page 664**)** 1-2 weeks delivery"

Semi-Standard(1) Brazed Drill (Carbide Tipped):

Ordering Example:

GD – 05520– 0500 – 57 – ER – IC908

(carbide grade)(2)

Drill Diameter	Overall Length	Driver Type	E=Head Profile R=Rough (P-Polished)

Diameter out of standard range Standard geometry **AND**/**OR** head profile from page 71 **AND**/**OR** coating Standard driver from the table (page 664**)** 3-4 weeks delivery

Special(1) Gundrill Carbide Tipped:

Ordering Example:

SPGD – 05520– 0500 – 02051 – 01

Drill Diameter	Overall Length	Offer No. or Drawing No.	Version No.

Any special specification (special geometry, special driver, etc.) 3-4 weeks delivery

Repair (Replacement of the Carbide Tip)

Repair of Standard(1) Drills

Ordering Example:

RSTGD – 05520– 0500 – IC08

(The only available carbide grade)

Drill Diameter	Overall Length

Repair of Semi-Standard(1)

Ordering Example:

RGD - 05520- 0500 - GR- IC508

(carbide grade)(2)

Drill Diameter	Overall Length	G=Drill Profile R=Rough (P=Polished)

Repair of Special(1) Drills

Ordering Example:

RSPGD - 05520- 0500 - 02051 - 01

Drill Diameter	Overall Length	Offer No. or Drawing No.	Version No.

Single Flute Solid Carbide Gundrill Designation

New Tools

4-6 weeks delivery for any kind of solid cabide gundrill

Standard(1) Solid Carbide Drills

Ordering Example:

STCGD– 05500– 0200 – 05

Drill Diameter	Overall Length	Driver Type

Semi-Standard(1) Solid Carbide Drills

Ordering Example:

CGD – 05520– 0200 – 05 CPIC08

Drill Diameter	Overall Length	Driver Type	C=Drill Profile P=Polished (R=Rough)

IC08=Carbide Grade(2)

Special (1) Solid Carbide Gundrills

Ordering Example:

SPCGD -05520 - 0500 - 02051 - 01

Dril Diameter	Overall Length	Offer No. or Drawing No.	Version No.

Repair of a solid carbide drill is not possible

Special(1) Two Flute Carbide Tipped Gundrill Designations

Ordering Example:

GD2L - 05520- 0500 - 02051 - 01

Drill Diameter	Overall Length	Offer No. or Drawing No.	Version No.

1. Standard gundrills: delivery within 1-2 weeks from order (shipment time not included). Semi-standard gundrills: delivery within 2-4 weeks from order (shipment time not included) Special gundrills: delivery within 8-10 weeks from order (shipment time not included)
2. Available carbide grades: **IC08** – uncoated grade used as a substrate for the following coated grades: **IC908** (TIAlN); **IC508** (TiCN+TiN); **IC308** (TiCN); **IC208** (TiN)

Standard Geometry Resharpening of Carbide Tipped or Solid Gundrills

(See page 662)

Ordering Example:

stgrind - 05520

Drill Diameter

Special Geometry Resharpening

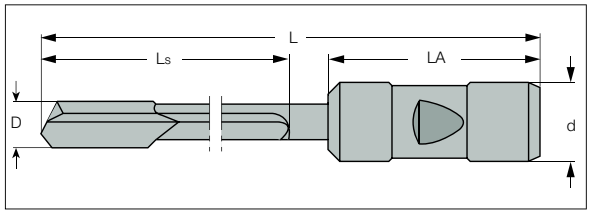
Ordering Example:

SPGRIND- 05520 - 02051 - 01

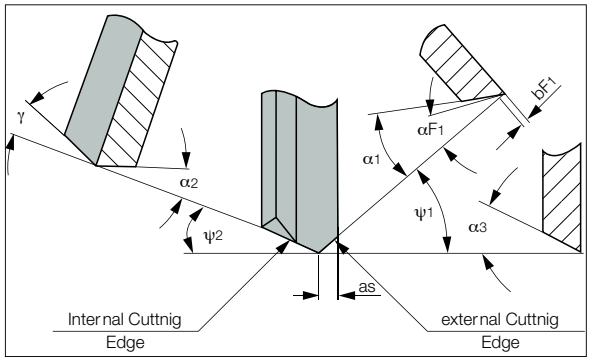
Drill Diameter	Offer No.	Version No.

Gundrill Inquiry Form

1. Tool
Quantity.....
Nominal diameter and tolerance .....
Please fill in dimensions on the sketch below.



Driver
For standard drivers please use codes
from page 664.....
☐ Code No.
☐ Special, please attach sketch and specifications.
Grind: ☐ special (fill in the dimensions and angles below).

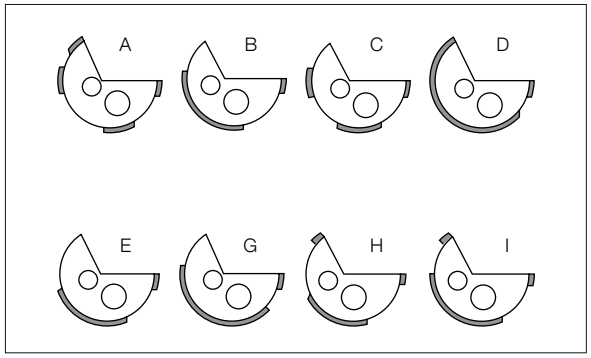


α1= ..... αF1= ..... ψ1= .....
α2= ..... bF1= ..... ψ2= .....
α3= ..... as= ..... γ= .....

□ Standard (see page 662)

Coating:
☐ TiN ☐ TiCN ☐ TiN+TiCN ☐ TiAlN ☐ Other
☐ **IC208** (TiN) ☐ **IC308** (TiCN) ☐ **IC508** (TiCN+TiN)
☐ **IC908** (TiAlN)

Type:
Please circle the required type. See page 663.



2. Workpiece
(If possible, please attach a drawing)
2.1 **Material**
Material description (**DIN** material number or any other standard):
.....
Hardness and Properties:
.....
☐ Short Chips ☐ Long Chips

2.2 **Hole Type**
☐ Blind Hole ☐ Drilling into Pre-hole
☐ Angled Entry
☐ Drilling into Solid ☐ Boring ☐ Angled Exit
Drilling Depth mm Hole Tolerance

2.3 **Application:**
Workpiece ☐ Stationary ☐ Rotating
Tool ☐ Stationary ☐ Rotating

3. Machine
3.1 **Technical Data**
Machine Type.....
Power ..... kW .....

3.2 **Cutting Data:**
Cutting Speed Vc ..... m/min .....
Revolutions Nmin ..... **RPM**, Nmax ..... **RPM**
Feed Fmin..... mm/rev,
Fmax..... mm/rev.....
Feed Rate **VF** ..... mm/min .....

Coolant:
☐ Oil ☐ Soluble Oil ☐ Other
Coolant Pressure ..... Bar .....

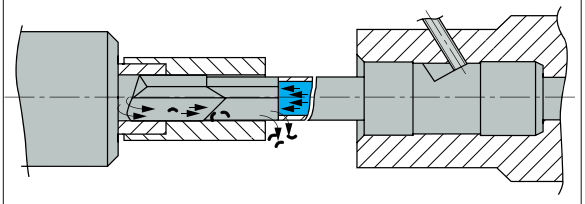
Sketch of drilling application

Note: It may be necessary to change several of the parameters that you indicated based on our experience with your application.

Typical Gundrill Applications

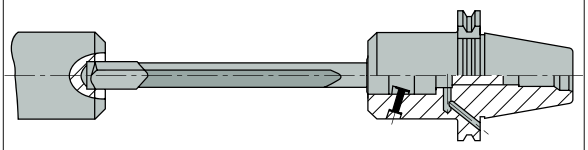
Main Drilling Methods

Figure 1



Guide Barrel

Figure 2



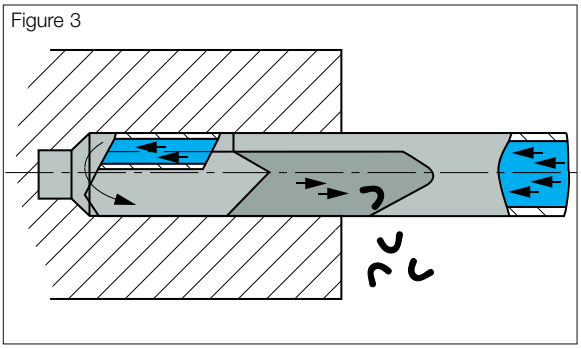
Pre-Drilled Guide Hole

User Guide

The gundrill is not a self-centering tool. Therefore an external means must be used to guide it to the point of entry into the workpiece.
It is recommended that the machine tool be equipped with a means for guiding the gundrill, preferably during the entire drilling process.
An alternative method is a pre-drilled guide hole (figure 2), which is common for machining centers. Once the drill has been fully engaged into this hole, it continues to be self-guided.
The guide pads contribute to the high degree of calibration and provide burnishing of the drilled hole.

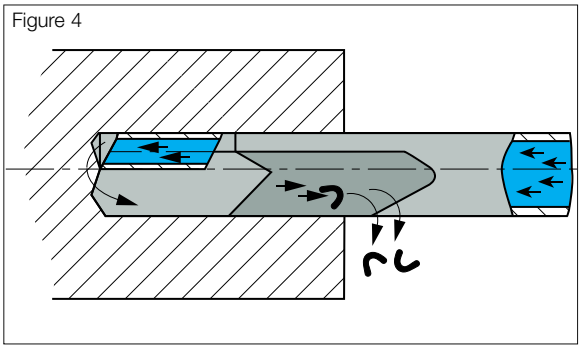
Typical Gundrill Applications - Chip Evacuation and Coolant Flow

Figure 3



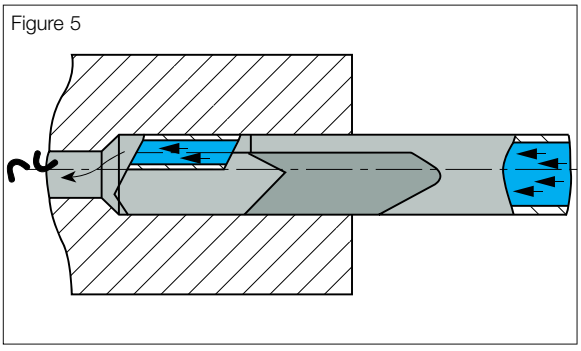
Boring with chip evacuation and coolant flowing opposite the boring direction

Figure 4



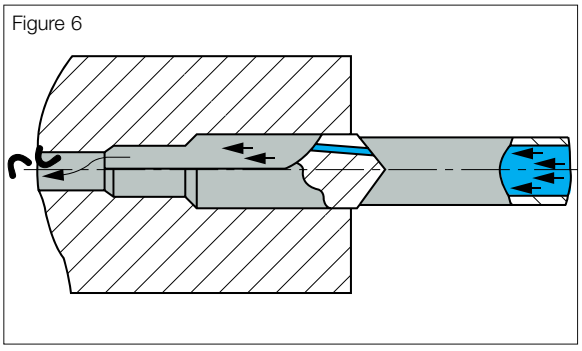
Drilling of solid material with chip evacuation and coolant flow opposite the drilling direction

Figure 5



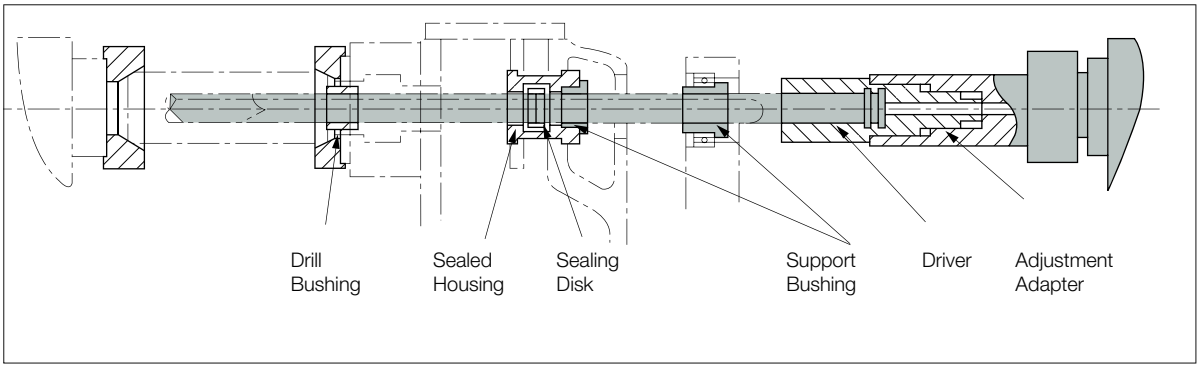
Boring with chip evacuation in the boring direction

Figure 6



Boring with a staged tool
Chip evacuation and coolant flow in the boring direction

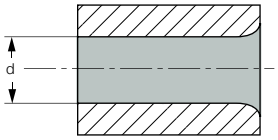
Deep Hole Machine Accessories



Bushing

Based on modified **DIN** 179 specify the "d" diameter of the drill. Carbide bushing is delivered only on request.

d = Drill diameter +0.02

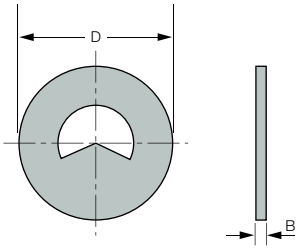


Guide Bushings

As the gundrill is not a self-centering tool and its radial rigidity is low (due to diameter to length ratio), a guide bushing is an essential component for a proper gundrill operation. The function of the guide bushing is to direct the gundrill into the material during penetration. The diameter of the guide bushing should be within 20 microns larger than the diameter of the drill. Dedicated gundrill machines are equipped with a guide bushing system.

Sealing Disk

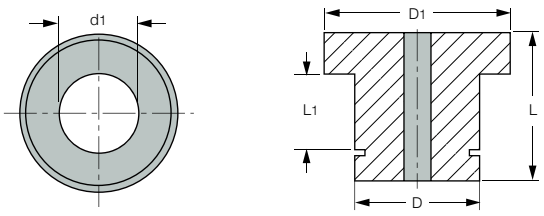
Supplied with a single sealing disk or a protection sheet. Indicate the dimensions needed for your requirements.



Sealing Disk		
Tool Ø "d"	Ext. Ø "D"	Thick. " B"
2 to 6	20	3
3,1 to 15,559	32	4
15,6 to 25,999	40	4
26 to 40	90	4

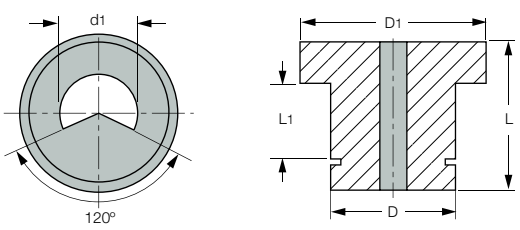
Sealing Disk with Protection		
Tool Ø "d1"	Ext. Ø "D"	Thick. " B"
2,9 - 5,249	20	7
5,25 - 14,449	32	11
14,45 - 25,999	40	12
26 - 41	90	12

Support Bushing
Indicate the "d" diameter of the drill



Support Bushing				
Tool Ø "d1"	Ext. Ø "D"	Ext. Ø "D1"	Length "L"	Length "L1"
1,9 - 16,399	20	26	20	12
1,9 - 25,999	30	38	26	16
1,9 - 34	45	50	26	16

Support Bushing with "V" Form
Indicate the "d" diameter of the drill



Support Bushing with "V" Form				
Tool Ø "d1"	Ext. Ø "D"	Ext. Ø "D1"	Length " L"	Length " L1"
1,9 - 16,399	20	26	20	12
1,9 - 23,799	30	38	26	16

ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Material No.
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1
		>= 0.25 %C	Annealed	650	190	2
		< 0.55 %C	Quenched and tempered	850	250	3
		>= 0.55 %C	Annealed	750	220	4
			Quenched and tempered	1000	300	5
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200	6
			Quenched and tempered	930	275	7
				1000	300	8
				1200	350	9
	High alloyed steel, cast steel, and tool steel		Annealed	680	200	10
			Quenched and tempered	1100	325	11
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12
			Martensitic	820	240	13
M	Stainless steel		Austenitic	600	180	14
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15
			Pearlitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum-wrought alloy		Not cureable		60	21
			Cured		100	22
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23
			Cured		90	24
		>12% Si	High temperature		130	25
	Copper alloys	>1% Pb	Free cutting		110	26
			Brass		90	27
			Electrolitic copper		100	28
	Non-metallic		Duroplastics, fiber plastics			29
			Hard rubber			30
S	High temp. alloys	Fe based	Annealed		200	31
			Cured		280	32
		Ni or Co based	Annealed		250	33
			Cured		350	34
			Cast		320	35
	Titanium Ti alloys			RM 400		36
			Alpha+beta alloys cured	RM 1050		37
H	Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Cast iron		Hardened		55 HRC	41

(1)For workpiece materials list, see pages 1008-1043

Gundrill Recommended Machining Conditions

Mtl. No.	Cutting Speed vc m/min	Feed vs. mm/rev Drill Diameter mm				
		2.0-9.79	9.8-11.69	11.7-13.19	13.2-16.19	16.2-40
1	70-110	0.01-0.03	0.03-0.05	0.035-0.06	0.04-0.07	0.02-0.10
2	80-110					
3	70-100					
4	70-110					
5	70-90					
6	80-110	0.01-0.03	0.03-0.05	0.035-0.06	0.04-0.07	0.02-0.10
7	70-110					
8	60-90					
9	50-80					
10	50-70	0.01-0.03	0.025-0.04	0.03-0.045	0.035-0.05	0.12-0.10
11	40-70	0.01-0.03	0.025-0.04	0.03-0.045	0.035-0.05	0.12-0.10
12						
13						
14	40-80	0.01-0.03	0.025-0.04	0.03-0.045	0.035-0.05	0.02-0.10
15	70-100	0.01-0.40	0.04-0.1	0.05-0.12	0.06-0.14	0.05-0.20
16	70-100					
17	80-110					
18	80-110					
19	90-115					
20	90-115					
21	80-160	0.02-0.04	0.03-0.17	0.03-0.18	0.035-0.19	0.03-0.15
22						
23						
24						
25	80-120					
26	80-180	0.02-0.04	0.02-0.13	0.03-0.16	0.04-0.18	0.03-0.15
27						
28						
29						
30						
31	25-60	0.01-0.03	0.025-0.03	0.03-0.035	0.03-0.04	0.02-0.10
32						
33						
34						
35						
36						
37						
38	20-50	0.01-0.03	0.025-0.03	0.03-0.035	0.03-0.04	0.02-0.10
39						
40						
41						

Gundrill Troubleshooting Guide

	Possible Causes																														
Hole Problems	Poor clamping	Insufficient coolant flow	Low coolant pressure	Incorrect coolant type	Feed fluctuations	Too high feed	Too low feed	Spindle speed too high	Spindle speed too low	Material structure	Material shrinking due to heat	Workpiece thin wall section	Misalignment	Undersized hole	Rough cutting edge finish	Built up edge	Worn out edge	Interrupted chip flow	Too small flute clearance	Incorrect drill profile	Incorrect head angles	Vibrations	Oversized bushing	A gap between bushing and workpiece	Bushing undersize	Loss of coolant pressure	High coolant pressure	Overheating coolant	Insufficent coolant	Head inside angle excessive wear	Head outside angle excessive wear	Too short carbide head	Tool heal drag	Worn supporting pads
Oversize	+	+				+							+			+		+		+	+	+	+	+			+		+	+		+	+	+
Undersize			+								+									+	+			+	+	+					+	+		
Rough surface finish		+	+	+	+	+			+		+			+		+	+	+		+	+	+		+		+		+	+	+	+	+		
Runout	+				+	+			+	+	+	+	+		+		+	+	+	+	+	+	+	+	+				+	+	+	+	+	+
Conical entrance						+															+	+	+	+		+									
Curved hole axis	+				+	+				+		+	+		+		+	+	+	+	+	+	+	+			+		+				+	+	
Drill Problems																																			
Breakage	+	+	+		+	+		+		+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+			+			+	+	+
Chipping					+		+			+					+		+		+		+	+											+		
Poor drill life		+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+
Excessive margin wear	+			+				+					+	+			+	+	+	+					+				+			+	+		
Excessive corner wear				+				+		+	+				+	+	+			+	+	+							+			+		+	
Excessive flank wear		+		+		+		+					+	+				+	+		+			+	+				+			+	+		
Drill heat		+				+		+			+			+					+							+		+	+			+	+	+	
Flute bending					+	+		+					+					+		+	+	+			+	+			+	+	+	+	+	+	
Damaged wear pad				+				+		+	+		+	+				+	+	+		+			+	+			+	+	+		+	+	
Built-up edge				+	+	+	+		+	+					+		+			+	+	+				+					+	+			
Cratering				+		+			+	+					+		+			+	+	+							+	+				+	